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ABSTRACT

A DESCRIPTION OF THE SOCIAL EXCHANGE LABORATORY'S WORK WITH AUTISTIC CHILDREN IS PRESENTED. THE LABORATORY'S PHILOSOPHY OF THE EXCHANGE THEORY OF AUTISM, SEEN AS A SET OF HABITUAL RESPONSE PATTERNS MAINTAINED AND INTENSIFIED BY EXCHANGES WHICH ARE INADVERTANTLY STRUCTURED BY OTHERS IN THE CHILD'S ENVIRONMENT, IS SET FORTH WITH CHARACTERISTICS, EXAMPLES, PATTERNS AND THERAPY CONSIDERATIONS FOR THE AUTISTIC CHILD INCLUDED. EXCHANGE THERAPEUTIC PROCEDURES WHICH REVERSE OR REPLACE THE FUNDAMENTAL AUTISTIC HABIT PATTERNS ARE DEVELOPED AROUND SEVEN STAGES; FOOD IS INITIALLY USED AS A POWERFUL REINFORCER AS THE CHILD PROGRESSES THROUGH THEM. THE PROCEDURES AND REPORTS OF THESE TECHNIQUES AS USED IN THE LABORATORY ARE EXPANDED AND DESCRIBED WITH CASE HISTORIES, THERAPIST PROCEDURES AND EXCHANGES BETWEEN THE THERAPIST, CHILD AND PARENT. (WW)

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REPORT 3

PROGRAM ACTIVITY 12

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STRUCTURED EXCHANGE AND CHILDHOOD LEARNING: THE SEVERELY RETARDED CHILD

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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THE SEVERELY RETARDED CHILD

Children may be retarded for a number of reasons. Some of these involve physiological deficits due to damage or genetics. Other deficits, however, are functional, that is they are the result of some series of adverse experiences with the social and/or physical environment. Also, retardation varies in degree from minor to very serious. The report which follows describes the laboratory's work with a number of autistic children who were moderately to severely retarded when the laboratory staff began to work with them. As will be noted in some detail later, autism has been thought by some to be a result of physiological deficit. The research and the educational program developed in this report suggest that autism is functional, that autistic children have peculiar learning disorders which result in their rather severe retardation. While the educational procedures developed in this program were successful in educating a sample of autistic children, they have, to date, only been tested on autistic children. However, these procedures may make possible or accelerate the education of many other types of severely retarded children.

Autism

In 1943, Leo Kanner, a child psychiatrist, published a description of what he thought was a unique form of schizophrenia which he called infantile autism. The term autism derives from auto, the Greek word for self. Children with this syndrome are called autistic because to the casual observer they appear to be self-contained, this is, sealed off into a world of their own. The most severe cases never learn how to talk, although some learn how to echo or to imitate randomly the sounds which others in their environment make.

According to an estimate made by the National Association for Mental Health in the early 1960's, perhaps one-half million children in the United States suffer from "severe emotional disturbance," sometimes diagnostically referred to as "psychotic" or"borderline psychotic" (Weston, 1965). Because of the conceptual and operational inadequacies of psychiatric nosology, we can only guess as to the number of autistic children in the United States -- our best guess would be that among the one-half million severe emotionally disturbed children, ten thousand are autistic. Though this might prompt one to conclude that autism is rare, actually it is as common or more common than either blindness or deafness (West, 1965).

While rare, autism has received considerable attention as a problem worthy of research and treatment primarily because of its severity as a psychotic disorder. The autistic child spends almost all of his waking hours engaging in bizarre self-stimulatory behavior, which is often self-destructive (Lovaas, 1967). He sits in a corner for hours staring intently at his fingers or at a shiny object, rocking back and forth, back and forth. During the day he makes hundreds of ritualistic gestures, moving his hands and fingers in a fixed pattern, pulling at his hair, twisting his face into strange expressions. He scratches, he pinches, he strikes himself, he bites at his arms and his shoulders raising huge callouses and welts sometimes tearing his flesh (Lovaas, Shaeffer and Simmons, 1965). The autistic child seems alone even in the presence of his parents and other people (Hingtgen, Sanders, and De Myer, 1966). He pays little or no attention to others, avoiding not only physical contact with others but even their gaze (Lovaas, 1967). Half of all autistic children are mute (Rimland, 1964). Those who do have speech do not use it to communicate. They either endlessly repeat words they have heard at sometime or another or they parrot in a meaningless fashion what others say to them (Lovaas, Kassorla, 1966).

Actually, however, the autistic child's range of activity is extremely narrow, (Ferster, DeMyer, 1966). Rarely do they do anything for themselves, for example dressing and feeding, and they do not usually cooperate with the directives or questions of others. On the contrary, when not engaged in self stimulation, they can be found running through the house throwing everything off the tables, destroying furniture, and wall paper, pulling and pushing on their parents to get them food, to turn on music or anything they happen to want at the time. When frustrated their destructiveness increases (Lovaas, 1967). They may strike their parents, bite themselves, or throw themselves against the wall or onto the floor, kicking and screaming.

Until recently the prognosis for autistic children has been poor (Eisenberg, 1956). Almost all of them are faced with a life of confinement at home, or in an institution for the chronically ill. In either case, cost in terms of human life is enormous. Not only do autistic children lead wasted lives but the lives of their parents are full of constant torment from the behavior of the child and from their own feelings of guilt, frustration, and hopelessness.

The above description is a composite picture of autistic children. As in other childhood disorders, autism varies in both severity and number of symptoms. Since Kanner's original description of this syndrome numerous analytical articles have been published in an attempt to clarify the symptoms. Rimland (1964) argues that only a small proportion of children ordinarily diagnosed as being autistic are in fact appropriately labeled. Autism, he argues, has become a convenient category in which to dump a multitude of problems. The extent to which this confusion obtains no doubt stems from Kanner's own writings in which he lists "extreme self-isolation" and "perseveration of sameness" as being the "cardinal symptoms" without which the diagnosis of infantile autism could not be made (especially Kanner and Lesser, 1968). Rimland (1964), however, argues that although these two symptoms are necessary, they are not sufficient for the diagnosis of infantile autism.

Thus there is considerable confusion in the published literature concerning what should and should not be diagnosed as autism. In an attempt to clarify the situation, Wing (1966) suggested three types: (1) early infantile autism where the symptoms as described by Kanner are notable in the first six months of the child's life; (2) childhood autism, where the two cardinal symptoms plus a variety of other diverse symptoms develop around the age of two years; (3) autistic-like children, a category used to describe children who may have a number of symptoms in common with those children included in the first two categories. Since these distinctions are enjoying some currency, we will explore them in some detail.

Early Infantile Autism. While they differ on what are the necessary and sufficient symptoms of infantile autism, Kanner's and Rimland's list of traits are so similar that it will not be necessary to differentiate them. From his work at Johns Hopkins Hospital Clinic, Kanner has estimated that over the years he has seen slightly over one hundred children with infantile autism. One major determinant of infantile autism is the age of onset. Although both Rimland and Kanner agree that the autistic syndrome is present "from the beginning," obviously not all of the symptoms are present from infancy. Once the diagnosis has been made, in retrospect, a number of the following symptoms could have led to an earlier diagnosis: (a) the failure of the infant to be responsive when approached by an adult, particularly the mother; (b) the development of unusual fixed feeding problems; (c) an indifference to attention for hours at a time; (d) frequent head-banging and other self-destructive behavior; (e) the slow initial development of motor skills, although their quick mastery when they finally appear; (f) the conspicuous development of autistic aloneness as the child matures is manifested in his refusal to attend to others in his environment, particularly in his looking past people, sitting for hours staring at a wall, or rocking back and forth; (g) the appearance of the second of the cardinal symptoms, perseveration of sameness which refers to the ritualistic-like behavior that the child engages in, perhaps taking the form of ritualistic repetitive play with the same object or bizarre hand or face movements which are repeated over and over again, or severe tantrums when something in the physical environment is changed as when a chair gets broken; and (h) the absence of normal speech.

The absence of normal speech in particular has diagnostic significance. While half of the autistic children are without functional speech by age five, those who have some speech have certain abnormalities in common; delayed echolalia, pronomial reversal, and affirmation by repetition. Often those who finally do develop functional speech are extremely literal in the use of language.

Childhood Autism. Although the symptoms are markedly similar to those discussed under early infantile autism, Wing distinguishes this category from the first because the symptoms are not present from the beginning of life, but start to occur as late as the third or fourth year of life.

Autistic-Like Children. This category includes children with a rather heterogenous group of symptoms. Most prevalent here are behaviors which involve a separateness from social environments. Specifically included are such symptoms as gaze aversion, lack of interest in others, long periods of solitary play, a lack of interest in peers, lack of speech, and hyperaggression.

Epidemiology

Data on the prevalence of autism are as yet neither complete nor totally reliable. However epidemiological studies, such as they are, are improving in quality. Lotter (1966) conducted an extensive survey of one county in England and reports a total of 4.5 cases of autism per 10,000 children. This figure, however, includes those with a firm diagnosis (2.1 per 10,000) and those with many of the symptoms of autism (2.4 per 10,000).

The sex distribution among autistic children seems to be rather clearcut in all reports. There is a pronounced prevalence of male cases; Lotter (1966), for example, reports a ratio of 2.75 to 1 for those with a firm diagnosis of autism and 2.4 to 1 for those with many of the symptoms of autism. Kanner (1954) encountered 80 boys and only 20 girls in his practice at Johns Hopkins University. Creak and Ini (1960) report a ratio of 4.5 to 1. These data are further confirmed by Keeler (1957) and Anthony (1958).

The prevalence of intellectual parents was first reported by Kanner (1943) in the original article on autism. Although this finding has been questioned by many as a simple case of selectivity, Wing (1966) and Rimland (1964) provide summaries of the evidence of the unusually high intellectual capacity of the parents of autistic children. Lotter's (1966) data seems to support these findings and furthermore his sampling procedure ruled out selectivity, since he studied the entire population of Middlesex county in England.

Consonant with the above findings are data (Lotter, 1967) showing the socio-economic level of parents of autistic children. Most families of autistic children are located in the upper and upper middle classes. Lotter's survey data showed 60 per cent of the fathers of firmly diagnosed autistic children were in classes 1 and 2 compared with 18 per cent of the general population. Pitfield and Oppenheim (1964) found 60 per cent of the fathers of autistic children in occupational classes 1 and 2. Gillies', Mittler, and Simon (1963) found 83 per cent of the parents of autistic children in their sample were in class 1 and 2 (on Raven's progressive matrices) compared with an expectation of 20 per cent.

Theories of Autism

In the past there have been two general theories of autism, biogenetic and psychogenic.

Bio-genetic theories of autism. Biogenetic theories of autism postulate either a genetic or a physiological cause based on the findings that (1) the disorder is observed among some children very early in life, i.e. the first six or eight months; (2) there is a constant ratio of 3 or 4 boys to one girl; (3) the autism syndrome is closely simulated in brain damaged children; (4) there are no "gradations" of autism; and (5) the syndrome is highly unique and specific (Rimland, 1964).

The genetic theories of autism and schizophrenia, as represented by that of Franz Kallman, usually postulate hereditary factors (a recessive gene) predisposing the individual to respond to certain stimuli with an autistic or schizophrenic reaction. The genetic factor is, then, a necessary condition. Genetic theories do not rule out environmental factors however; rather they argue that such environmental effects will only precipitate autism or schizophrenia in a person already genetically predisposed. Kallman (1946) asserts that "a true schizophrenic psychosis is not developed under usual human life conditions unless a particular predisposition has been inherited by a person from both parents".

Three methods, often in conjunction, are used to ascertain the influence of genetic factors. The "family history" method traces the occurrence of the disorder in a family to show that the occurrence is consonant with predictions based on recessive genetics. If the predictions are born out, the genetic theory is, of course, not proved but has only withstood disconformation. The effect of blood relationship is itself established by the "contingency method" in which the incidence of the disorder is compared for a representative sample of groups differing in a degree of blood relationship. Here statisticly significant differences between the groups offer evidence of the effect of genetic relationship on the incidence of the disorder. Finally in an effort to control for the effects of environment, the "twin study method" was used in which the incidence of the disorder among pairs of different types of siblings (monozygotic, dizygotic, etc) in different environments (same or different) is observed.

According to Kallman who focuses on the latter two methods, the evidence in favor of the genetic theory is most impressive. For instance, the morbidity rate for the offspring of the schizophrenic parents he studied range from 16.4 to 68.1 or from 19 to 80 times the average expectancy. Secondly, the percentage of sibling pairs in which both had schizophrenia range from 1.8 per cent for step-siblings to 85.8 per cent for monozygotic co-twins. Moreover, as to the effects of the environment, 22.4 per cent of the monozygotic twins reared in different environments had schizophrenia while 49.3 per cent of dizygotic twins in the same environment did not have schizophrenia.

Biochemical or physiological theories on the other hand propose that a specific biochemical inbalance or structural defect is responsible for the specific symptoms in the disorder. The Epinephrine theory, for instance, relates schizophrenia to the faulty metabolism of epinephrine, results being hallucinations (Kety, 1959). Likewise, the Serotonin theory suggests that the symptoms of schizophrenia are the results of a sereotonin deficiency arising from metabolic failure (Kety, 1959).

C. F. Carlson (1967) proposes an interesting theory that autism is the result of an arrest in development of the two neurological systems responsible, on the one hand for drive energy, and on the other hand for affective contact and experience of a reward. The arrest in the development of the latter system results in a high state of activity in the child but an inability of the child to "feel" the consequences of his activity, and hence, an inability to learn.

In addition, several physiological theories imply that autism is not the direct result of a specific biochemical inbalance or neurological deficit but rather is a secondary reaction to such deficits. Bender, for example, sees autism not as an inborn impairment of the nervous system but as a defense reaction to one. Bender feels that autism enables the child to protect himself from the anxiety and disorganization arising from a more basic genetic and structural pathology by withdrawing (Bender, 1960). Similarly, Goldstein views autism as a defense against the child's inability to engage in abstract thinking. Again, autism has protective mechanisms safeguarding the child's unbearable anxiety (Goldstein, 1959).

The most recent and perhaps the most fully articulated biogenic theory is Rimland's (1964) theory of "cognitive dysfunction". He argues that the basis of the autistic syndrome is the child's impaired ability to relate new stimuli to remembered experience. Hence the child does not use speech to communicate because he cannot symbolize or abstract from concrete particulars and he is unresponsive to his parents because he does not connect family with previous pleasurable experiences.

Rimland proposes that the "cause" of the child's cognitive dysfunctioning is an impairment in the brain's reticular formation, that part of the brain which links sensory input and prior content. Such impairment, he hypothesizes may be due to an excess of oxygen given in infancy which destroyed the not yet developed reticular tissue. The autistic child, he argues, may be predisposed to being overly sensitive to oxygen. The child of highly intelligent parents is likely to have a highly developed brain which taking longer to develop is susceptible to oxygen damage at the time of birth.

There are some problems with the biogenetic theories and with the evidence used to support them. For example the genetic theorists comparing twins in the same and different environments never specify precisely what aspect of the environment are the same or different. It is thus quite reasonable to suggest that geographically "different" home environments could actually share the particular environmental features which actually are responsible for the autistic symptoms, thus accounting for the finding that one-egg twins separated geographically have a high rate of concordance in the incidence of autism or schizophrenia. Similarly, evidence for biochemical inbalances in schizophrenics is obtained from hospitalized schizophrenics. It is possible that the experience of hospitalization itself with its unique emotional configuration might produce the biochemical inbalances.

Secondly, biogenetic theories posit a causal factor temporarily distant from the presently existing disorder. The question from a therapeutic point of view is what is responsible for maintaining the disorder at present. In other words ultimate causes may be irrelevant to the problem at hand.

Third, most genetic theories have pernicious implications since there is no way to undo the influences of genetic factors and no way to repair a damaged nervous system. The implication usually drawn is that therapy, at best, is limited. Some researchers for instance, advocate chemical therapy to increase the sensitivity of the reticular formation. Others advocate training programs whereby the autistic child may learn to utilize what "limited ability" he has. Either response, however, leads to low expectations which in effect assign the child to an earthly purgatory.

While biogenetic theories are attractive to some, particularly to parents of autistic children, biochemical therapy which is implied by such theories, has been singularly unsuccessful with autistic children Rimland reports. Perhaps the most promising of drugs tried with autism is deanol ("deaner," by Riker Laboratories) a relatively new psychic-energizer which is specially recommended for children with learning and behavior problems. Among the studies which deanol has been reported used with children's behavior disturbances is one by Tobias (1959) which included two autistic children. Since a table in which Tobias provided a breakdown of his cases included schizophrenia, emotional disturbance, retardation and brain damage as separate categories, it seems safe to assume that the term "autistic" was not being used indiscriminately. Both cases of autism reported by Tobias showed "good" improvement. "Good" was the second of four categories not quite as good as "excellent" which required "spectacular reversal" of symptoms. Rimland observed "improvement bordering on the spectacular" in a four year old autistic child after a short time on 150mg per day of deanol; muteism disappeared and was replaced by slowly developing but still autistic speech. However, Rimland concedes that not all experience with deanol in autism has been favorable. Several trials with it has had to be discontinued because the children become hyperactive (personal communication of Ebbinghaus to Rimland).

In addition some work has been done with shock therapy. Rutter, Greenfeld and Lockyer report several cases had electro-convulsive therapy, insulin coma, or leucotomy. These were either not improved or worse after treatment.

The Psychogenic theories. Like the biogenetic there are several psychogenic theories of childhood autism (Goldfarb, 1961) and others such as Spitz and Bowlby (1961) cite maternal deprivation as the cause of hospitalism, a syndrome often identified as autism. Similarly, Eisenberg and Kanner see autism as a reaction to parental treatment, that is, the child may be autistic because he is responding to the cold, obsessive, mechanical treatment he receives from his parents (Eisenberg and Kanner, 1956).

By far the most popular psychogenic explanation of autism is Bettleheim's psycho-analytically oriented explanation. According to Bettleheim, autism is "basically a disturbance of the ability to reach out to the world. . ." (1967). The cause of the disturbance is found in the relationship between a parent and a child. In order for the child to feel secure enough to "reach out" to the world, to enter it as an active participant, a child must develop self confidence, i.e., a feeling that the self is potent, that the efforts of the self can be realized in the world. Bettleheim feels that the parents of the autistic child have prevented such feeling from developing in the child. They have either stifled his attempts to manipulate his environment or have forced the child to attempt too much, the result being failure. For instance, the mother may prevent the child from experimenting with the use of his arms and hands during eating by making sure the child is always clean while he eats, or by not allowing the child to attempt to feed himself, or the parent may, at the other extreme, require the child to feed itself although the child does not feel ready.

In any case the child fails to experience with the feeling of "mutuality" between his needs and the satisfaction of his needs through action with others and the success of his own positive responses in the world. As a result the child rejects the world. The world is a hostile, frightening place for him and he feels that he is not potent enough to survive it; thus he withdraws from it. He does not interact with others, he is unresponsive to them, he occupies his time and energy in repetitive manipulation of familiar objects. Even if he does have speech he is unable or unwilling to refer to himself as "I" since he has no "self".

It may be noted that Bettleheim's theory of childhood autism was influenced greatly by his experience as a Jew who spent time on death row in Buchanwald, the Nazi concentration camp where so many of his people were incinerated. He noted that many adults and children reacted to this extreme threat by withdrawing with symptoms similar to those of autistic children. They developed most, if not all, of the symptoms of the autistic child.

Therapy for Bettleheim requires that the autistic child have positive experiences with others, that the autistic child learn that he can interact satisfactorily with others, that his own actions have a predictable influence on the environment. In this way the child will see that the world is safe and that he himself is potent. He will thus relinquish his autistic defenses, repetitive gestures, his apathy, etc, which enable him to block out the world. Such milieu therapy requires the child to spend many years engaged in intimate relationships with a very few persons who become, as it were, parents surrogates in a permissive environment.

Like the biogenetic theories the psychogenic theory are somewhat problematic. The core of the psychogenic theory is that the child becomes emotionally disturbed through his interaction with his parents very early in his life. Thus the psychogenic theories also postuate a cause which is temporally distant from the present autistic behavior of the child. While such a factor may be relevant to the incidence of the disorder, it is not necessarily relevant to the persistence of the disorder.

Related to the above, psychogenic theories like the biogenetic theories, discount the autistic symptoms themselves as a secondary problem. The "real" disorder is an emotional disturbance, "sick" personality within the child. Since the causal factors have produced the internal sickness, therapy is aimed at curing that internal sickness through various methods: catharsis, interpretation, play, body contact, etc. Once the inner illness is cured, the autistic symptoms (defenses) will disappear.

The test of the psychogenic theories might well be the success of their respective therapy. Kanner (1954) notes that autistic children who receive the most intensive psychiatric care have shown poorer records of recovery than those provided little or no treatment. This seems to be an extreme evaluation, however, although it does represent a considered opinion of a very distinguished child psychiatrist. The best data available shows that 27 per cent of a sample of autistic children who received no extensive psychiatric treatment later achieved a fair to good social level. These data represent the best estimate of what is now generally called the spontaneous remission rate, i.e. the incidence of improvement or cure without specific treatment. The results of this study are quite comparable with those of a second study by Eisenberg of a group of 63 autistic children who had received extensive but mixed psychotherapy. After therapy 27 per cent achieved a fair or good social level. (Actually his data show 4.8 per cent achieving a good social level whereas 22.2 per cent achieve a fair social level.) In comparison, the 40 autistic children which spent from 9 to 12 years in Bettleheim's milieu therapy, 42 per cent achieved a good social level and 37 per cent a fair social level. It is on the basis of this differential and his very pleasant writing style, The New Republic characterized Bettleheim as the "Hero of our Times."

However, only 14 out of 40 of Bettleheim's autistic children were non-verbal, that is were mute or echolalic without functional speech. As Wing notes "the absence of speech is still one of the major handicaps of the autistic even in adolesence and early adult life. Just under half of Kanner's cases (30 out of 63) remained mute (Kanner and Eisenberg, 1956. Eisenberg, 1956). A similar proportion remained without useful speech (29 out of 63) in the Modsley Hospital study (Rutter and Greenfield, 1966) and (9 out of 20) in the Smith Hospital study (Mitler, et al, 1966)."

Eisenberg has shown that mute autistic children tend not to respond to psychotherapy. One out of 31, or about 3 per cent in his non verbal sample showed good to fair improvement. Rutter (1965) found that most of the non verbal children who do show some improvement with psychotherapy are ecolalic. Unfortunately Bettleheim does not indicate what proportion of his non verbal children were echolalic. However, 8 out of the 14 non verbal children, or 57 per cent did make good to fair progress after 9 to 12 years in therapy. Rutter, Greenfeld and Lockyer. (1967) for mixed therapy of a sample of 23 echolalic children, 50 per cent showed a good or fair social adjustment at follow up.

Learning Theory of Autism. As noted both the biogenetic and psychogenic theories tend to see autistic symptoms as secondary problems as manifestations of an internal disorder. Recently learning theorists have proposed that each symptom of the autistic child is controlled not by intrapsychic defenses but is a learned habit pattern. Thus learning theory, or conditioning theory regards the symptoms, that is the behavior of autistic children as a central problem to be explained and treated. The only differences between a normal and the autistic child are behavioral. The autistic child does not speak, cooperate or play in an appropriate fashion. Hence they reason that on one hand the autistic child does not experience the conditions in which speech, cooperation and play could be learned appropriately, while on the other hand the conditions have been such that the child has learned habit patterns of withdrawl, autistic aloneness, perseveration of sameness, etc. Consequently, the learning theorists, particularly the operant conditioners, have developed what they call reinforcement therapy to systematically teach the child how to talk, how to cooperate, how to play. Also they have created therapeutic situations where disruptive, bizarre behaviors are extinguished or are inhibited through the systematic use of punishment.

In general the therapeutic procedures developed by the operant conditioners have been very successful. All of the four autistic children which Lovaas initially treated made very substantial progress while in the laboratory. Over a period of two years all learned to talk functionally, if brokenly. All learned to cooperate, to play with the therapists. All list their primary autistic symptoms. Three of these children who were returned to their home or placed in foster families maintained their improvement. This may have been because the parents were given minimal instructions as to how to treat these children, that is, how to reinforce normal behavior and extinguish or inhibit autistic behavior. Several other cases who showed similar progress in Lovaas' laboratory completely reverted, however, within a month or so after therapy had been terminated when they were placed in a different mental hospital. *

Risley and Wolfe (1967) successfully trained 12 echolalic children to talk functionally using operant conditioning procedures. While the children, who remained in the mental hospital where they were trained, have maintained their functional speech, those children who were returned to their families have shown continued improvement.

Other operant conditioners have also attempted to train parents systematically to apply some of the basic principles of conditioning theory in the home. Williams (1956) for instance instructed parents how to eliminate their child's nightly temper tantrums by putting the child to bed, leaving the room, and then ignoring the child's tantrum. Within 9 days there were no more tantrums. Similarly Wolfe and Risley (1966) taught the parents of an autistic child how to teach their child how to work puzzles and to name objects and how to eliminate the child's shrieking and crying.

Although the operant conditions have had far more success in training autistic children and in training parents than the biogenetic and psychogenic therapists, their approach has several important drawbacks both theoretical and practical. First, the operant conditions are psychologistic. They seem to have little conception of the social nature and a social context of autism. They reduce autism to a simplistic one-way relationship between responses and consequent reinforcement. More specifically they tend to neglest the possibility that the behavior of

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*Personal communication

the parents is directly responsible for the development and maintenance of the autistic patterns and the autistic deficits of a child. Also they ignore the possibility that the behavior of the parents is reciprocally controlled by the behavior of the child. In other words they neglect the fact that the autistic child is engaged in working structured exchanges with his parents in which the behavior of each is controlled by the behavior of the other.

Thus they overlook the structured nature of the relationship between a parent and child. They do not mention the parents inappropriate reinforcement of their child's autistic behavior patterns, reinforcement which is relatively consistent and relatively continuous. In a word, they are insensitive to the social structure of the relationship between the parent and child who structure relatively stable patterns of exchange. Such a conception of the structured nature of the social exchange between the child and the parent is indeed crucial to an understanding of socialization in general, and the socialization of an autistic child in particular; for unless the reinforcement of the behavior is consistent, unless it is reinforced over and over and over again, it will not become part of a childs repertoire.

Finally, since the operant conditioners focus on the one-way relationships between a specific responses and specific reinforcers, i.e. since they consider neither the exchanges nor the pervasive structures of the exchanges in the family, they are unable to see that the development of an autistic child represents socialization itself. The child is learning a whole repertoire of behavior. He learns to nag, to whine for food, to pull, to push his parents for music, to scream, to bite himself, to engage in repeticious bizarre hand movements, etc. for attention.

The Exchange Theory of Autism

As noted in the previous sections there are a number of scientists that believe that autism is the result of some genetic or acquired disorder of the nervous system. When we began our investigations of autism this hypotheses was entertained as a likely possibility.

However, as we worked with these children we found that the question of genetic or other physiological deficits were not crucial. As with other phenomena that has some physiological basis, e.g., I.Q., the important issue is the degree to which the potential is realized. As far as we could tell,the autistic syndrome is a set of habitual response patterns which is maintained and intensified by exchanges which are inadvertantly structured by the others in the child's environment. These exchanges which maintain and intensify autism as far as we could tell get structured inadvertantly, often by accident, but once structured, a vicious circle develops which relentlessly drives a child further into the autistic pattern.

The first withdrawal reaction often appears to be the result of trauma, as Bettleheim observed, or possibly as the result of isolation or neglect as Pitts and his associates observed. However, once the mother observes the child's abnormal behavior, she panics, begins to attend, to pamper, to baby the child in a way she never had before. By anticipating his every need without his signalling that need, the mother inadvertantly structures an exchange where the random non-verbal behavior so typical of the autistic syndrome is systematically reinforced. This pathogenic exchange debilitates the child and so he does not develop the normal attention-getting skills. Consequently, the child begins to behave in bizarre, destructive ways to get the mother's attention. As these additional symptoms begin to show up, the mother worries, she begins to be more solicitous, more helpful, anticipating his needs even better than before. Thus, the child never learns to work his environment in a normal way. He can get by without learning how to talk, without learning how to work the normal positive exchanges. In all this, mother's attention always becomes a signal for other forms of reinforcement. Hence, due to the processes of conditioning, before long the mother's attention becomes a conditioned reinforcer. That is, the child learns that he can get his mother's attention, when she doesn't give it simply by behaving in certain ways, even though she wouldn't have normally given him attention. He does not have the ability to get it by talking, by working positive exchanges, but he does learn to get it by engaging in disruptive, bizarre behavior, for such behavior is usually intolerable to a mother in our society and she will attend to it if only to punish it. Thus, the child learns to play the exchange game "Get Mother's Attention." This is the game that Larry was playing in the first quoted inset in the beginning of the first chapter. Whenever Larry was negative or disruptive, his mother reciprocated consistently by becoming exasperated. When she stopped reciprocating by becoming exasperated, when she started ignoring his disruptive behaviors during training, and when she started to use her attention to reinforce his cooperative verbal behavior, Larry made a dramatic change which eventually culminated in the second incident.

All of our autistic children also play the game "Help Me, I'm Stupid." They are great con artists although it is not obvious to the casual observer.

However these children begin to tip their hand after they are well into therapy. For example, when we started with Larry, he had a sickly smile, but almost no functional speech, no attention span, no small motor skills. A clinical psychologist who diagnosed him had not diagnosed him as autistic, but as an untrainable mental retardate with an I.Q. of perhaps 30. Yet Larry had most of the classic symptoms of autism, and we suspected that he was feigning inability as a way of getting what he wanted from his mother and then from other adults. However, he began to respond to the attractive exchanges which we structured for him to work, and as he did, he began to tip his hand. For example, at one point when his mother was being trained to be an assistant therapist, the following incident occurred:

Mrs. C. told Larry that as soon as he strung some beads he could have gum from the gum machine which was across the room. For about ten minutes he fumbled, he whined, all the time crying, failing, saying "I can't." Finally, he threw the beads at his mother at which point she timed him out on the couch for one minute. He sat there quietly, a little subdued. After getting up from the couch, he picked up the beads and kept looking at the gum machine. Again, whining, fumbling, crying, and failing. At this point, the mother had the good sense to leave the room and to say, "As soon as you string those beads, you can have your gum." With his mother out of the room, he sat right down and in less than 30 seconds, filled a string with beads with no apparent trouble. He did not whine, he did not cry, he did not fumble, he just strung the beads with the dexterity of a normal five-year old. After completing the entire string, he showed them to his mother who reciprocated with a penny. After putting the beads back in their box, Larry went over to the gum machine, deftly placed the penny in the slot, and got his piece of gum. He SMILED!

Also, to get attention, most autistic children play the game "Look at Me, I'm Bizarre" when engaging in repetitive, strange behaviors. Most adults, including mothers, inadvertantly, but almost unavoidably, look at the child and thus reinforce his behaviors with their attention. If man were simply a mechanical machine, that did not learn, that did not become conditioned to respond in certain habitual ways to relatively structured exchanges in his environment, such inadvertant exchanges would not be serious. However, man does not have the characteristics of the simple machine. He does learn. As he works structured exchanges over and over again, he develops his ability, he develops stronger and stronger habits, even if his tastes are conditioned and thus change as a result of this conditioning. Thus, one can observe inadvertant exchanges as they develop. The child becomes more and more disruptive, more and more dependent, more and more bizarre, and more and more alienated from the positive exchanges which are structured in his environment. What is sad is that his parents and others in the child's life sense that something is terribly wrong, but the more they do, the worse the situation becomes.

To some, this interpretation may seem dubious. However, we were driven to it as we looked at the interaction between autistic children and their parents through exchange theory. Other theorists have looked at autism with the eyes of biologists to develop biogenetic theories. Others have looked at autism with the eyes of psychologists, interpreting symptoms as they might function for the personality in terms of defenses from anxiety or a fixation due to trauma, or with the eyes of a conditioner looking at the autistic symptoms in terms of accelerating and decelerating behavior patterns. However, we have viewed autistic behavior as part of an exchange pattern in a social system. While it is possible to see the same phenomena from a number of perspectives, this does not necessarily mean that all the perspectives are equally relevant or useful. The exchange perspective, as does the other perspective, has certain implications for therapy. As with the other perspectives, the validity of the exchange theoretical interpretation must be tested experimentally. Ultimately, the effectiveness of the therapy grows out of it.

The Characteristics of Autism

As one reads the literature on autism, and as one observes autistic children interacting with their parents or with a therapist, one is struck both with the plethora and with the diversity of symptoms. Yet as one analyzes the exchange functions of the various symptoms, it is obvious that many are functional alternatives to one another, and that some are more basic to the propagation of the disorder than are others. Since the type of therapeutic procedures used depends to a large extent upon the exchange functions of behavior, an exchange typology of autistic symptoms seems to be appropriate.

Like Kanner, it seemed to us that autistic children have two cardinal syndromes. However, we have defined these syndromes somewhat differently according to their exchange functions - autistic seclusion and attention-earning behavior.

Autistic Seclusion

Kanner used the term "extreme self isolation" to characterize one symptom or family of symptoms which are essential to the autistic pattern. We have used the term "seclusion" which implies "the shutting away, or a keeping apart of one's self . . . so that one is either inaccessible to others or is accessible only under very difficult conditions" (Webster, 1942). Thus the autistic child is secluded in the sense of his keeping himself apart so that he is inaccessible to others or is accessible only under very difficult conditions and under his own terms. However, autistic seclusion is manifested in a number of different ways: (1) by gaze aversion, that is, avoiding looking into another's eyes; (2) by aloof preoccupation in the presence of others, which is perhaps what Kanner meant by "autistic aloneness"; and (3) by the avoidance of the presence of others, a mild anthrophobia.

The above symptoms, gaze aversion, "autistic aloneness", and anthrophobia are considered by some to define "autism". (Rutter 1966) However, Rutter (1966) goes on to say that, "The course of 'autism' and of the speech disorder run closely together but whereas it is rare for a child to retain normal speech but for severe 'autism' to persist, it is more common for a child to remain mute and still lose his 'autism' (Rutter, 1965 b). This suggests that insofar as one may be due to the other, it is more usually the speech abnormality which is primary and the 'autism' secondary."

While we, like Rutter, consider lack of speech more basic than the "autistic" symptoms, we consider it also to be part and parcel of the autistic seclusion syndrome. For a number of possible reasons, the child does not develop his verbal ability to make contact with his social world, rather, he chooses to live in verbal seclusion. Some autistic children are completely mute, that is, they make no sounds whatsoever, others engage in gibberish, others are echolalic, that is engage in parrot talk, etc. and finally others are near mutes, that is, have two to fifty functional words.

Furthermore, most autistic children do not imitate significant others in their environment. While other writers on autism have not noted or perhaps commented on this characteristic, the absence of the developed imitative pattern is characteristic of all the autistic children we have seen. It reflects another kind of seclusion. Autistic children are not aware enough of other humans to copy behavior patterns that other humans appear to use successfully in coping with their environment.

From our perspective, the lack of speech and the lack of an imitative pattern are crucial to the progressive development of the autistic syndrome. As Bandura and Walters (1965) have documented in great detail, normal human beings ordinarily become socialized primarily via the imitative processes, that is, they develop a learning set to copy behavior which they see others using successfully in the environment. In our terms, to be sucessful in using behavior means that the behavior is rewarded in the making of structured exchanges. Speech is also crucial in the normal socialization process. First, it is used to mediate or negotiate, most of the positive exchanges which normal people typically work in everyday life. Second, speech is essential since it is necessary to the explicit learning-teaching process which is so characteristic of normal human society.

Illicit Attention-Earning Behavior

Kanner labeled these symptoms necessary to the autism syndrome as "perseveration of sameness." In a literal sense, perseveration of sameness is not an autistic pattern at all, but a normal human pattern.

Even the most civilized men have ritualistic patterns which they repeat over and over again, hourly, daily, weekly, or even yearly. Kanner undoubtedly was referring to mainly the repetitious, bizarre behavior rituals that seem to preoccupy autistic children. The autistic children treated in our laboratories have been characterized by a large number of such behavior rituals, which may be categorized as follows:

Ritualized hand motions, stereotyped positions, repetitive noise-making, rocking, dancing, indiscriminate mouthing of objects, goofy eye movements, unusual food preferences, drooling, sniffing, dry-eyed crying, creepy touching, lining up objects, senseless laughing or smiling, hand-biting, and other self-injuring practices such as head-banging.

As implied by the naming of the larger category, the exchange function of these repetitious, bizarre behavior patterns is to earn illicit attention. As noted in an earlier section, most adults involuntarily look at such behavior and some seem to have almost a compulsion to stare. More importantly, perhaps, parents have often been observed by the staff to hug their autistic children while the child engaged in these bizarre behaviors, and the bizarre behaviors stop for a time. The usual pattern is for the parent to ignore the autistic child until the behaviors increase in frequency and intensity to a certain level, at which point a parent will cuddle the child until the child stops. In a few moments, the parents will set the child down and start to ignore him. Typically the child will start the bizarre behavior patterns again, until finally the parents will pick up the child, hold him and hug him, until the bizarre pattern stops again, etc. So goes it. Such exchanges are often observed in the waiting room to the laboratories, and even, of all places, in church.

However, these bizarre behavior rituals are not the only patterns which earn illicit attention. As we have seen in the paper on hyperaggressive children, disruptive behavior, negativism, malicious teasing, and more severe forms of aggression all function to earn illicit attention in our culture. A great many autistic children develop these behavior patterns. In fact, Kanner pointed to a particular kind of aggression, tantruming, as a characteristic of autistic children. He thought it to be a part of the perseveration of sameness pattern. Most autistic children develop dependency routines which they apparently expect their parents to follow in great detail. Characteristically, when such routines are changed in any detail, an autistic child will tantrum to some degree.

As implied, we consider these illicit attention-earning patterns to be derivative of autistic seclusion. In general, they function as alternatives to normal attention-earning patterns. Consequently, once a child learns to use the normal patterns, these bizarre patterns can be eliminated rather easily. This is true except for one of the illicit attention-earning patterns - Negativism.

Negativism is basic because unless the pattern is changed, the child can never learn in a normal way. There are several manifestations or degrees of negativism, ranging from feigned inability to refusal to follow instructions, to refusal to respond, to response reversal (doing exactly the opposite of that which is asked). Any of these manifestations of negativism can cripple the child so that he will not work normal, positive exchanges. Since all of the autistic children in our laboratories seem to have one or more manifestations of negativism, an early stage in in the therapy for almost all autistic children involves the replacement of the negative pattern with the more positive cooperative pattern.

Finally, autistic children vary in a number of ways similar to normal children, for example, in activity level. Some are hyperactive, some are normally active, and others are hypoactive. In our experience, the hyperactive and normally active children respond better to therapy. Autistic children also vary in age. In general, the younger the child the better he will respond to exchange therapy. Autistic children vary in intelligence. Rutter feels that intelligence, as measured by Merrill Palmer IQ test, is more predictive of therapeutic success than any other single characteristic of autistic children. Because of our experience in producing massive changes in IQ, that finding both interests and perplexes us. However, one of the autistic children who has received exchange therapy in our laboratories is by far the brightest of any of the children which we have seen. (This includes a number of normal children from upper-middle class families who topped out, i.e., scored 149, on the individual Stanford-Binet Intelligence Test.) Others, however, when we have first seen them appear to have no measurable intelligence. To give the reader a feel for the distribution of autistic behavior patterns, an inventory is given in Table 1 for eighteen autistic children who have been in therapy at the Social Exchange Laboratory.

A few words about the children. Mary and John would probably not be classified as autistic if gaze aversion, anthrophobia, and autistic aloneness were considered to be the essential characteristics of autism. However, both were essentially mute and had not developed an imitative pattern when they were accepted for therapy. These characteristics we consider much more basic to autistic seclusion than gaze aversion,

TABLE 1

CLASSIFICATION OF BEHAVIOR - DISTURBED CHILDREN

Behavior	Mary	Jerry	Larry	Linda	Peter	Joey	Billy	John	Jake	Lois	Luke	Kristen	Jeff	Michael	Ross	Kim	Sean	Marty
Clings	+	-	+	-	-	-	-	-	+	-	-	+	+	+	-	-	-	+
Cuddles	-	-	+	-	-	-	-	-	-	-	-	+	+	-	-	+	-	+
Hyperactivity:																		
Normal.	...	...	...	...	...	...	+	...	...	...	...	...	...	...	...	...	...	...
Overly active.	+	...	...	+	+	...	...	+	...	+	+	...	+	...	+	...	...	+
Under active	...	...	+	...	...	+	...	...	+	...	...	+	...	+	...	+	+	...
Short attention span . .	+	+	+	+	+	+	-	-	-	-	+	+	+	+	-	-	-	-
Bizarre Behavior:																		
Ritualized hand motions	-	-	+	-	+	+	+	-	+	+	-	+	+	+	-	+	+	+
Hand biting.	-	-	-	-	-	-	-	-	-	-	+	+	-	+	-	-	-	+
Self-injury	-	-	-	-	+	+	-	+	-	+	-	+	+	+	+	+	-	+
Stereotyped positions . .	+	+	-	+	+	-	+	-	+	+	+	+	+	+	-	+	+	-
Repetitive noise making.	+	-	+	-	+	+	-	-	+	-	+	+	+	+	+	-	+	+
Spinning objects. . . .	-	-	-	-	-	-	+	-	-	+	+	-	+	+	+	-	+	+
Rocking and dancing . .	-	-	-	-	+	+	-	-	-	+	-	+	-	+	-	+	+	+
Indiscriminate mouthing.	-	-	+	-	+	+	-	-	-	-	-	+	-	+	+	-	-	-
Goofy eye movements .	+	+	+	-	+	-	+	-	-	+	+	-	-	+	-	+	+	+
Unusual food preference	-	-	+	-	+	+	-	-	+	-	-	-	-	+	-	-	-	+
Drooling.	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+
Sniffing	+	-	+	-	+	-	-	-	+	+	+	+	-	+	-	+	-	+
Dry-eyed crying . . .	+	+	-	-	+	+	-	+	+	+	-	+	-	+	+	-	-	+
Creepy touching . . .	-	-	+	+	-	-	-	+	-	-	-	+	-	+	-	+	-	+
Lining up objects. . .	-	-	-	+	+	+	-	-	-	+	-	-	-	-	+	-	-	-
Inane laughing, smiling	-	-	+	-	-	+	-	-	+	-	+	+	+	+	-	-	-	+

TABLE 1--(continued)

Behavior	Mary	Jerry	Larry	Linda	Peter	Joey	Billy	John	Jake	Lois	Luke	Kristen	Jeff	Michæl	Ross	Kim	Sean	Marty
Imitation:																		
Motor.	-	+	+	+	-	-	-	+	-	-	-	-	+	-	-	-	-	-
Verbal	-	-	+	-	-	+	-	-	-	-	-	+	+	-	+	-	-	-
Speech:																		
Mute.	+	+	...	...	+	...	+	+	+	+	+	...	...	+	...	+	+	+
Echolalic	...	...	+	...	...	+	...	...	...	...	...	...	+	...	+	...	...	...
Gibberish	...	...	...	...	...	+	...	...	...	...	...	+	+	...	...	...	...	...
Functional (no. words).	2	2	0	30	0	0	0	3	0	1	0	30	200	0	200	0	1	10
Negativism:																		
Does not follow orders .	+	-	-	-	+	+	+	-	+	+	+	+	-	+	+	+	-	+
Response reversal. . .	-	-	+	-	+	+	+	+	+	-	-	+	+	+	-	+	-	+
Feigned inability . . .	-	+	+	+	+	+	+	-	+	+	+	+	+	+	-	+	+	+
Aggression (offensive):																		
Against adults. . . .	+	+	+	-	+	+	-	+	+	-	+	+	-	+	+	+	-	+
Against peers	+	+	+	+	-	+	-	-	+	-	-	+	-	+	+	-	-	+
Malicious teasing . . .	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	-	+
Withdrawal:																		
Gaze aversion. . . .	+	+	-	+	+	+	+	-	+	+	+	+	-	+	+	+	-	+
Hands over ears . . .	-	-	-		+	-	+	-	+	+	-	+	-	-	-	-	-	+
Aloof preoccupation .	-	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+
Avoids others presence	-	+	+	+	+	+	+	-	+	+	-	+	-	-	+	-	+	
Blank Facial Expression	+	+	+	+	+	-	-	-	+	+	+	-	+	+	+	+	+	-
Tantruming:																		
Whines.	+	-	+	-	-	+	+	+	-	-	-	-	+	+	-	-	-	+
Screams	+	+	-	+	+	+	-	+	-	+	-	+	+	-	+	-	-	+
Destructiveness . . .	+	+	-	-	+	+	-	+	+	-		-	-	-	+	-	-	+
Self-Injury.	-	-	-	-	+	-	-	+	-	-		+	-	+	+	-	-	+

anthrophobia, or autistic aloneness. They were relatively typical on all other autistic characteristics. Of all the children accepted into the laboratory for therapy, these were two of the hardest to live with. Prior to entering therapy, Mary's mother was considering taking both her own and Mary's life, and John's mother had already consented, on their pediatrician's advice, to institutionalize John. Mary and John's well developed malicious teasing and their hyperaggression made life with them hell. Yet they responded to therapy about the same as the other children.

Most of the children developed autistic patterns around two years of age. However, there were exceptions. For example, Ross scored very high on Rimland's Infantile Autism Scale - a classic case. In general, we have now found age of onset of the autistic patterns to be particularly predictive of the severity of the disturbance. The severity of the autistic pattern appears to be related more to the absolute age of the autistic child than the age of onset. Difficulty in therapy appears to be more related to the degree of negativism, the absolute age of the child, and the initial level of speech than anything else. Ross, because he he was not particularly negative, and because he started therapy relatively early, at four years of age, has responded rather quickly to therapy. In our experience, the distinction between infantile and other types of autism does not seem to be very relevant or useful.

An Overview of Exchange Therapy

In general, exchange therapeutic procedures are designed to eliminate the autistic habit pattern and simultaneously, as the autistic patterns are eliminated, to establish normal habit patterns in their place. However, the focus on the therapeutic procedures is on establishing normal patterns which reverse or replace the fundamental autistic habit patterns, i.e., either lack of functional speech, lack of motor or verbal imitation, and lack of cooperation, that is negativism. In general exchange therapeutic procedures progress through seven stages briefly described in the following outline:

Stage One

Eliminate gaze aversion via a counter exchange. Eliminate bizarre and/or aggressive behavior via extinction.

Stage Two

Establish motor imitation of therapist by a food exchange for working puzzles. Begin to establish simple discrimination skills via work with puzzles. Begin to establish a habit pattern of attending to tasks. Continue elimination of bizarre and/or aggressive behavior via extinction. Train parents (1) in exchange and conditioning theory, (2) train them to structure simple positive exchanges on the discrimination tasks, and (3) train them to use extinction, i.e., ignoring and time-out procedures.

Stage Three

Establish a vocalization response pattern.

Stage Four

Eliminate negativism via counter exchange. Establish verbal imitation: (a) imitation of sounds, h, e, a, o, (b) imitation of blends, ba, le, la, lo, (c) imitation of food words, chip, pickle, meat. Continue to eliminate bizarre behavior via extinction.

Stage Five

Establish use of functional words in a food exchange, i.e., naming a food to obtain a bite of it. Establish a naming vocabulary to identify objects and then pictures of objects. Establish the use of syntax, via imitation and fading. Train parents to structure speech exchanges with children at home. Establish the token exchange to supplement the food exchange.

Stage Six

Change to classroom situation Three and four children with one therapist. Establish parallel work patterns. Continue with language development via food-talking exchanges. Establish free play patterns outdoors.

Stage Seven

Establish peer imitation, peer cooperation, and free exchanges with peers. Establish an ability to follow complex instructions from therapist. Establish organized play routines indoors. Establish reading, writing and arithmetic readiness. Continue to develop language via food talking exchanges.

The exchange therapy procedures used in our laboratories are similar to those developed by Risley and Wolf (1967), and by Lovaas (1966) and his associates. However, they differ in some ways. First, we do not use aversive or negative exchanges. Risley (1968) and Lovaas (1965) have used electric shock sticks to punish, that is to inhabit or suppress certain very disruptive patterns of behavior in autistic children. While these procedures may be essential to terminate extreme patterns of self-destruction, punishment may not be necessary. Indeed it may be harmful to the long run therapeutic process of autistic children. Punishment of any form seems to exacerbate the pattern of autistic seclusion. In our therapeutic procedures we have limited ourselves to terminating inadvertantly structured exchanges which reinforce the autistic patterns and simultaneously structuring positive exchanges which will reinforce normal patterns. In some instances we use counter exchanges, that is, to eliminate a pattern of responses we sometimes structure positive exchanges to systematically reinforce the reversed pattern. For example, to get rid of gaze aversion, we ordinarily structure an exchange to reinforce eye contact with the therapist. Second, our autistic children are not institutionalized. They live at home with their parents and siblings, and are brought to the laboratory for from twenty minutes to two and one half hours per day. Third, as soon as possible, usually within a month to six weeks, we train the mother to be an assistant therapist in the laboratory and in the home. This training usually changes the basic pathogenic exchange structure in the home and replaces it with a normal positive exchange structure. When successful, these changes in the home environment accelerate therapeutic progress and minimize regressions. Fourth, usually within six to eight months, the children are placed into a classroom situation where a teacher is able to work with four or five children at a time. This step is necessary to socialize the child to interact effectively with peers, and it sets the stage for schooling at a later time.

The first step in starting exchange therapy with a child is to find a powerful reinforcer. When we started with autistic children we tried to structure token exchanges similar to those we had with other children. Eventually we got them to work but not well. We therefore decided to structure food exchanges similar to those which Wolf, Risley and Lovaas and his associates had used sosuccessfully. The data in Figure 1 show a typical result. The food exchange will increase the rate of talking of an autistic child from three to eight times that sustained by a token

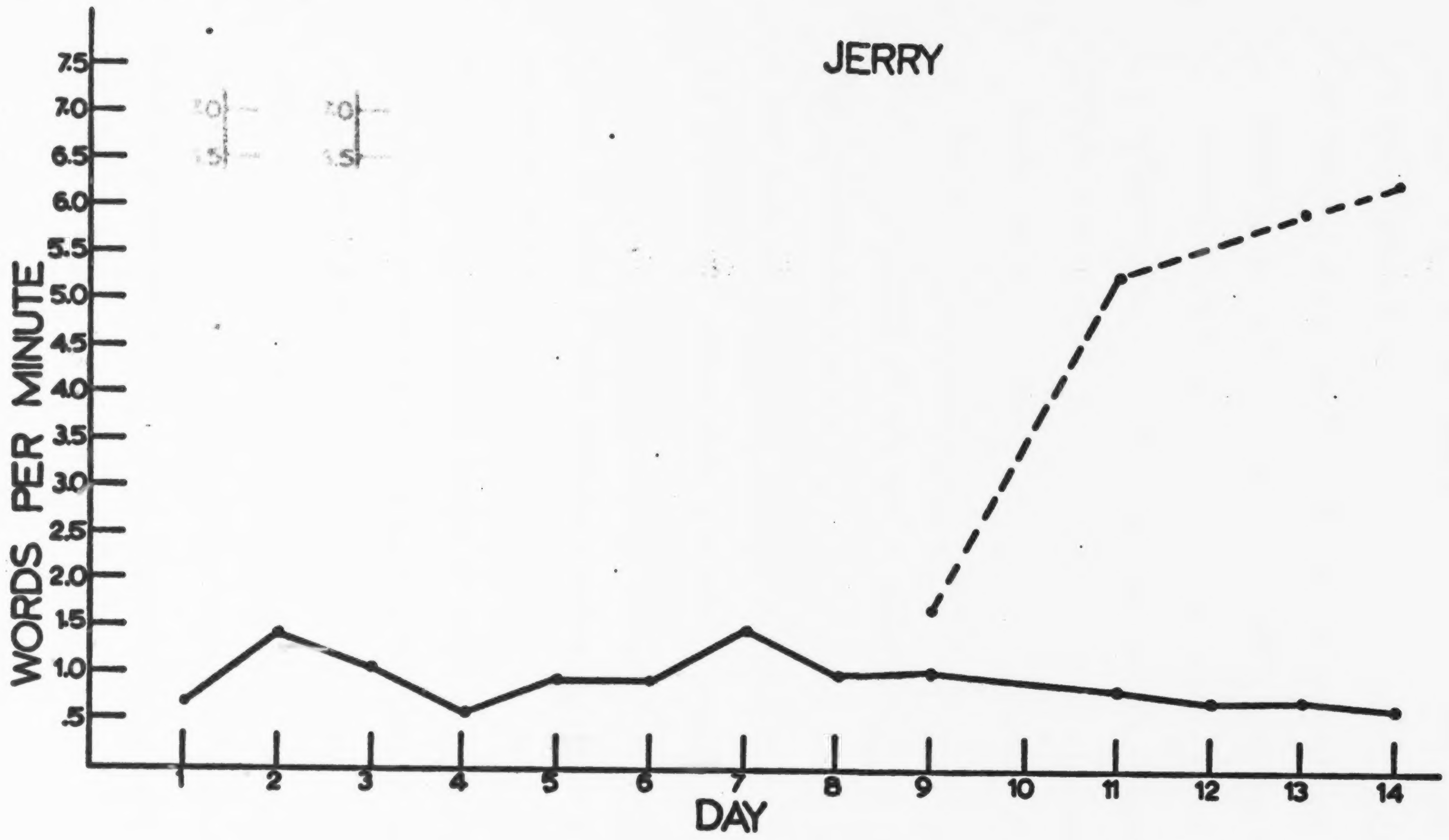

FIGURE 1. Words per minute through time with token-talking exchange (lines) and with a food-talking exchange (dashes). The two exchanges occurred at different times during the last six days of this experimental series. Subject: Jerry is a 4-year old, non-verbal autistic boy who had been in exchange therapy for four months.

exchange.

In a food exchange an autistic child learns to work the exchange signalled by the therapist, and for the appropriate initiatory response the therapist reciprocates with food. In other words, the child initiates the exchange by looking the therapist in the eyes, by fitting a piece correctly into the puzzle, by saying a sound, a word or a sentence, whatever the therapist requires. Then the therapist simply reciprocates with a bite of food. This may seem like an extreme measure to some, but then autistic children just will not engage in the positive exchanges that we are accustomed to in regular society. It is necessary to structure a much more powerful exchange, one that is meaningful to them. We have run a number of eight minute experiments which demonstrate this relation to talking. The data in Figure 2 are for Larry, a boy who had progressed well into the sixth stage of therapy. Even then, as may be noted in the figure, he would talk only when it was necessary to initiate a food exchange. In the A periods, when the therapist just pushed the tray with the child's food in front of him with the instructions that he could eat if he wanted, the child just did not bother to talk, this, although the therapist gave him the opportunity to do so, in that the therapist tried to carry on a conversation.

In addition to helping establish normal patterns, food exchanges become quite enjoyable to autistic children, perhaps because it allows them to "work" an adult. We have run a number of experiments which demonstrate this. For example, when Larry had been on a food exchange for about a month, the therapist would set two trays containing the same kind and amount of food before the child. He would give the following instructions: "You may eat the food on this tray free or you may eat

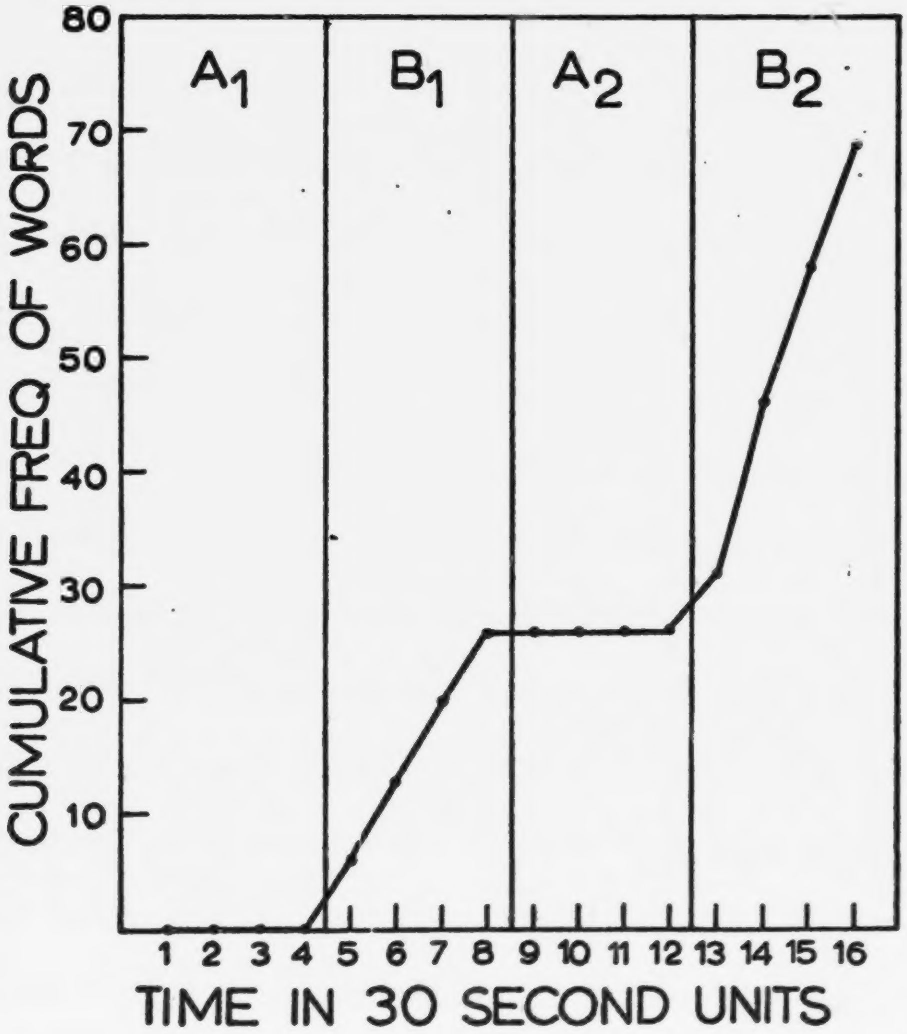

FIGURE 2. Cumulative frequency of functional words by Larry, a 4-year old echolalic autistic boy who had been in exchange therapy four months through time. In the A periods, Larry could eat without asking for it; in the B period, he had to tell the therapist what he wanted. He talked only when the exchange required it.

the food on this plate if you ask me for it." We ran the experiment three times, each time with almost identical results. The first half dozen Larry would eat from the free plate, saying nothing. Then he would stop eating and turn to the therapist and say, "I want a chip". The therapist would reciprocate by placing a chip on a napkin by Larry who would eat it. Then Larry would ask for something else and the therapist would reciprocate, and on until Larry had eaten about two thirds of the food from the therapist's plate. At that point he would continue to ask for the food on the plate until he had all of it on the napkin in front of him. Then he would say, "All done".

While the food exchange is more powerful than the token exchange, it does have one limitation. Children satiate on food rather quickly, usually in twenty to twenty five minutes. This is not true of tokens. Well designed token exchanges can be run all morning. Furthermore, with certain types of behavior which are less costly to autistic children than talking, such as sitting at a table, working puzzles, painting, and writing, tokens will sustain an adequate rate of work. Therefore, with autistic children we shift, as soon as possible, from just a food exchange for motor skills to a food exchange for talking and then supplement that by shaping them up to work a token exchange, an exchange they can work for two to three additional hours during a normal school day. In this way we are able to add a variety of learning experiences and to work effectively on a number of normal behavior patterns in addition to speech.

Stage One

Gaze aversion, avoidance of eye to eye contact with others, is a general characteristic of, although not peculiar to, autistic children. It is part of the autistic seclusion pattern. Eye contact in our culture ordinarily precedes a negotiation of all interpersonal exchanges. Eye contact is an essential way of communicating to others that one is attending to his speech and other behaviors. When one will now meet another's gaze, verbal communication with the other is virtually impossible.

Gaze aversion is an avoidance response, possibly a result of over-stimulation (Hutt, 1965) or possibly simply the result of aversive conditioning in prior exchanges.

The first step in resocializing an autistic child is to teach him to look other people in the eye. This is done for several reasons. First, eye contact is a precondition for all the exchanges which would be run during the first part of therapy with the children. Second, since gaze aversion is so central to autistic seclusion, when the child does begin looking others in the eye, it is usually taken by the parents as evidence of important therapeutic progress. This small step tends to validate our expertise and it encourages the parents to follow our instructions in the next stages of therapy. Third, like more normal behavior patterns, the autistic child ordinarily has to learn to work positive exchanges. Since eye contact is relatively easy, a food exchange for establishing eye contact is an ideal place for the child to start learning how to work positive exchanges.

Both Wolf and Risley (1964) and Lovaas (1967), in shaping up attending behavior in psychotic children have concentrated on getting the child to look at the therapist's mouth in order to facilitate the child's imitation of the therapist's lip movement. Eye contact is a more normal pattern in our culture and a child who will establish eye contact with others will automatically see the others lip movements since the lips are close enough to the eyes to be in the region of focus.

Procedures

The mother brings the child and his lunch to the laboratory for a 20 minute session each day. On arrival she cuts up the lunch in portions small enough to be tiny bites and arranges the food on a divided paper plate. The therapist takes the child and his lunch into a room ten feet by twelve feet that is furnished with a low table and two child size chairs. The therapist seats the child and sits down on the other side with the lunch.

If the child voluntarily looks at the therapist (which he often does albiet fleetingly) the therapist immediately reciprocates with a hearty "Good Boy", a pat on the back or a stroke on the head, and a bite of lunch. It is important that the reciprocation be immediate and the approval and the body contact precede the bite of lunch so that in a short time they will become a signal that the child will receive a bite of lunch. This is necessary if approval and body contact are to become conditioned reinforcers for the child.

If the child does not look at the therapist voluntarily some method must be devised to trick him into looking at her. In one favorite trick, for example, the therapist peeks at the child through a hallow building block. This behavior is unusual enough or bizarre enough so that even autistic children will return the look involuntarily. Be that as it may if the child looks he is immediately reinforced with approval, body contact and a bite of lunch. As the child continues to work the exchange the prosetic device is fazed out, that is, used less and less conspicuously until it is no longer needed. Alternatively the food can be held in front of the child's eyes and the spoon slowly moved until it is just in front of the therapist's eyes. This often results in the child inadvertently meeting the gaze of the therapist. When that happens the child is immediately reinforced with approval, body contact and then a bite of lunch.

Immediate reinforcement is extremely important in these early stages of therapy. Delays vitiate the power of the exchange. This is reflected in a decreased rate of working the exchange. It also results in superstitious learning, since if other behaviors are allowed to occur between the time the child emits the appropriate response and receives the reciprocation from the experimenter, these other behaviors will be reinforced. Hence a good therapist will complete his reciprocation within 2 or 3 seconds. This is not easy in the case of eye contact. The thereapist must be very alert because at first the glances given by the child may be so fleeting as to be practically unidentifiable. Success at this step is a direct function of immediacy of reciprocation.

The second goal in this first stage of therapy is to develop the childs' response pattern where he will look at the therapist eyes at the therapist's request. The exchange is now structured so that the therepist will reciprocate with a bite of lunch only if the child meets the therapist gaze within five seconds after being requexted to do so. If the first stage of therapy is conducted properly the child will voluntarily look at the therapist rather frequently, so this second step is relatively easy. As soon as the child regularly responds within 5 seconds by looking the therapist in the eye upon his request, the length of time the gaze is held is gradually to increase where he must hold the gaze from 5 to 10 seconds in order to receive reciprocation from the therapist. In other words food is now exchanged for a certain amount of time elapsing while the child gazes into the therapist eyes.

An exchange analysis of the procedures used at this stage is given in Table 2. Note that both the child and the therapist are reinforced in these exchanges. Exchange signals (after the child is conditioned to recognize them as signals of an exchange) become conditioned reinforcers because they proceed reinforcement in time. Also, the therapist's reciprocatory response is reinforcing to the therapist because it signals for her the completion of a successful exchange.

As noted in a previous paper, both parties to an exchange must find an exchange rewarding or profitable if the exchange is to be worked repetitively through time at a steady pace. This is true for the party who initiates the exchange and for the party who reciprocates, both the autistic child and the therapist.

In the above procedures, the therapist's approval and the therapist touching the child, precede food reciprocation, not because approval and touching are meaningful reinforcers for the child but in order to condition these as reinforcers for the child. Infants are not born with a hunger for approval, hunger for human contact. During the long process of socialization most children are naturally conditioned to value human approval and human contact. However, the usual socialization process has failed with the autistic child. Consequently, these procedures for establishing approval and human contact as conditioned reinforcers are built into exchange therapy from the beginning.

TABLE 2

ANALYSIS OF EYE CONTACT TRAINING

Actor	Behavior	Analysis	Reinforcement	
			Therapist	Child
Child	Looks at therapist	Initiatory response	X	
Therapist	Feeds	Reciprocatory response	X	X
Therapist	Holds up toy for child to see.	Exchange signal		
Child	Follows toy with eyes.	Initiatory response	X	
Therapist	Moves toy next to eyes.	Exchange signal		
Child	Eyes follow toy, fleetingly contacting therapist's eyes.	inadvertant Initiatory response	X	
Therapist	Shoves food in child's mouth with great haste.	Reciprocatory response	X	X
Therapist	Says "Look at me."	Exchange signal		X
Child	Looks at therapist while therapist counts to five.	Initiatory response	X	
Therapist	Approval, touching, then food.	Reciprocatory response	X	X

Stage Two

Motor Imitation of Therapist

During this phase eye contact is established as a generalized signal for the therapist to structure an exchange. Thus the therapist watches the child and as soon as eye contact is made, he gives an exchange signal.

In starting motor imitation training, the behavior which the therapist wants the child to copy becomes the specific exchange signal. Thus once eye contact is made the therapist puts his hands up in the air. This is a signal for the child to put his hands up in the air to initiate the exchange. Often after several tries, a child will spontaneously copy the therapist, i.e. he will also put his hands up in the air. If not, the therapist can prompt the child by lifting the appropriate hand up in the air with his own free hand. Then the therapist reciprocates with approval, a pat and food. Usually after one or two prompts with reinforcement the child will spontaneously imitate the therapist, thus anticipating the reïnforcement. The therapist then does other things; puts his hands down on the table, on his head, to his left, to his right, etc. Each time establishing eye contact before signalling the specific behavior which the child is to copy. At this point in time it is not always necessary to reciprocate with food. Every second or third exchange may be completed with just the approval and a pat. In general, however, new motor behaviors to be imitated should be reinforced fully with approval, a pat and then a bite of food, whereas behaviors which have been used to initiate a number of exchanges need not earn full reciprocation every time. (The fact that an exchange follows constitutes reinforcement of the child's imitating response.)

While the child and therapist work these imitation exchanges, the child will ordinarily engage in a rather large number of irrelevant behaviors. These all should be ignored. The therapist must keep his goal firmly in mind to recognize what behaviors are relevant and what are irrelevant. He should at first reciprocate for close approximations of the behavior which he ultimately wants. All other behavior should be ignored, that is, not reinforced in any way. When approximation is accepted as an appropriate initiatory response the next approximation to a perfect imitation should be slightly better thus the child's response will be gradually shaped or improved by a successfully better and better approximation. An exchange analysis of a typical sequence in early imitation training is given in Table 3.

Once the child imitates hand positions reliably, the therapist then begins structuring exchanges around toys and puzzles. For example, once eye contact is made, the therapist might drop a ball on the table. Then after it stops bouncing she might place it in the hand of the child. At this point a child might spontaneously drop the ball at which point the therapist reciprocates with approval, a pat and then food. If not and a prompt is needed, the therapist would gently push the ball from the child's hand and complete the exchange. The exchanges are worked over and over again and gradually enlarged to include more and more tasks. Often at this point, the child is taught by imitation how to put the three-piece wooden puzzles together. The therapist, as a next step, elaborates the specific exchange signal by accompaning the behavior to be imitated with a verbal instruction or request. For example, the

TABLE 3

ANALYSIS OF IMITATION TRAINING

Actor	Behavior	Analysis	Reinforcement	
			Therapist	Child
Child	Meets therapist's gaze	General exchange signal	X	
Therapist	Holds up one hand	Specific exchange signal		
Child	Wiggles in chair	Irrelevant behavior		
Therapist	Ignores child	No reciprocation		
Child	Looks away	Non-exchange signal.		
Therapist	Puts head down for a second	Time out		
Child	Meets therapist's gaze	General exchange signal		
Therapist	Holds up a hand	Specific exchange signal		
Child	Brushes his forehead	An approximate initiatory response	X	
Therapist	Approval, a pat, and then a bite of food	Reciprocation	X	X
Child	Eye contact	General exchange signal		
Therapist	Puts hand up	Specific exchange signal		
Child	Puts hand up	Initiatory response	X	
Therapist	Approval, a pat, and then a bite of food.	Reciprocation	X	X

therapist might put the puzzle piece in place and then take it out with the request "Now you put the piece in". It should be emphasized that these requests are for behaviors that have been established by imitation. In other words the instructions constitute a redundant exchange signal. An exchange analysis of a typical sequence is given in Table 4.

At this point it is possible to start fading out the behavior which the child has grown accustom to modeling. Thus just relying on the instruction. It is even possible to fade out the instruction and just rely on the motor behavior as a model. Or, it is possible to combine both. However, these procedures can be used to teach the child a large number of motor and discrimination tasks. Ordinarily at this point in their therapy, the autistic children in our laboratories learn to put together 10 to 20 puzzles and to work shape discrimination toys, color discrimination toys, etc. In addition, the parents can now be trained to be assistant therapists, working imitation exchanges with the child at home. The more experience the child obtains in working positive exchanges at this point in time, the better, for it will ease his progress through the more difficult phases later on.

Bizarre Behavior

Up to this time, bizarre behavior is ignored by the staff. The result is fairly predictable, many of the bizarre behavior patterns which the child brought with him to the laboratory will have been extinguished, or nearly so. However, an interesting phenomenon occurs. The child typically starts devoloping new bizarre behavior patterns, as though to replace those which he has lost. Sometimes a member of the staff will inadvertantly stare at the child the first time he engages

TABLE 4

MOTOR AND DISCRIMINATION TRAINING

Actor	Behavior	Analysis	Reinforcement	
			Therapist	Child
Child	Looks at therapist	General exchange signal		
Therapist	Puts puzzle piece in.	Specific exchange signal		
Child	Puts piece in.	Initiatory response	X	
Therapist	Approval, patting, and then food.	Reciprocation	X	X
Child	Looks at therapist	General exchange signa		
Therapist	Puts piece in and says, "Now you put it in."	Specific exchange signal		
Child	Puts piece in.	Initiatory response	X	
Therapist	Approval, patting, and then food.	Reciprocation	X	X

in this new bizarre behavior. When this happens the frequency of the behavior is accelerated. This child will appear to try over and over again to elicit the attention he once received illicitly. Gradually, however, if the new bizarre pattern is completely ignored, it too will be extinguished. The data plotted in Figures 3 and 4 show these growth and extinction processes for bizarre behavior patterns in two children. This phenomenon is similar to the symptom substitution phenomena that is often referred to in the psychiatric literature. However, the bizarre behavior patterns tend to disappear entirely as the child learns more and more how to work normal positive exchanges for attention, and other reinforcers. Hence, we expend a minimum of effort in eliminating bizarre behavior. Only those which cannot be ignored by the therapist result in any overt response. For these the child is timed out.

There has only been one exception of this in the history of the laboratory. Mary whom we encountered before was an extremely malicious child who before she was accepted into therapy, spent her whole days trying to keep her mother upset and unhappy. All of these procedures were extinguished by the usual ignoring and time out procedures. One exception was a rather special procedure we developed to extinguish her tantruming in the evening as described earlier. The second was a procedure used to terminate her extremely dangerous behavior which she habitually engaged in while riding with her parents in the family automobile.

Particularly on express highways where it was difficult to pull over, Mary turned into a virtual demon. She would take off her shoes, throw them out the window. She would kick the driver in the head; she would jump over the drivers shoulder into his lap. She

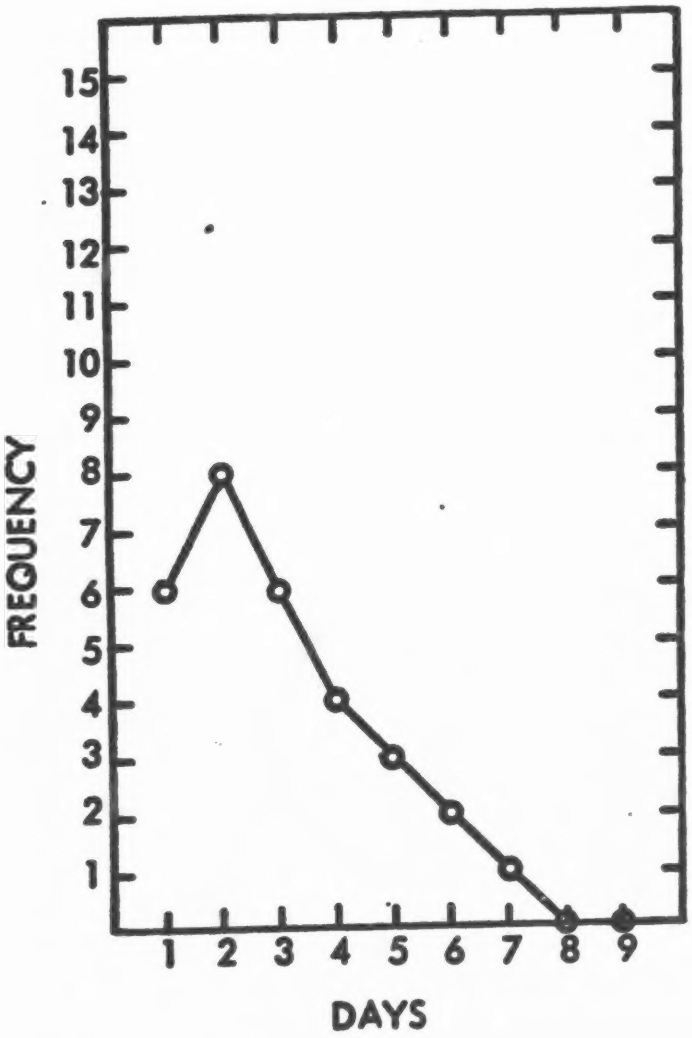

FIGURE 3. Number of bizarre behaviors on nine consecutive days for a seven-year old autistic boy. A tally was marked each time the child brushed his hair roughly to the side of his head.

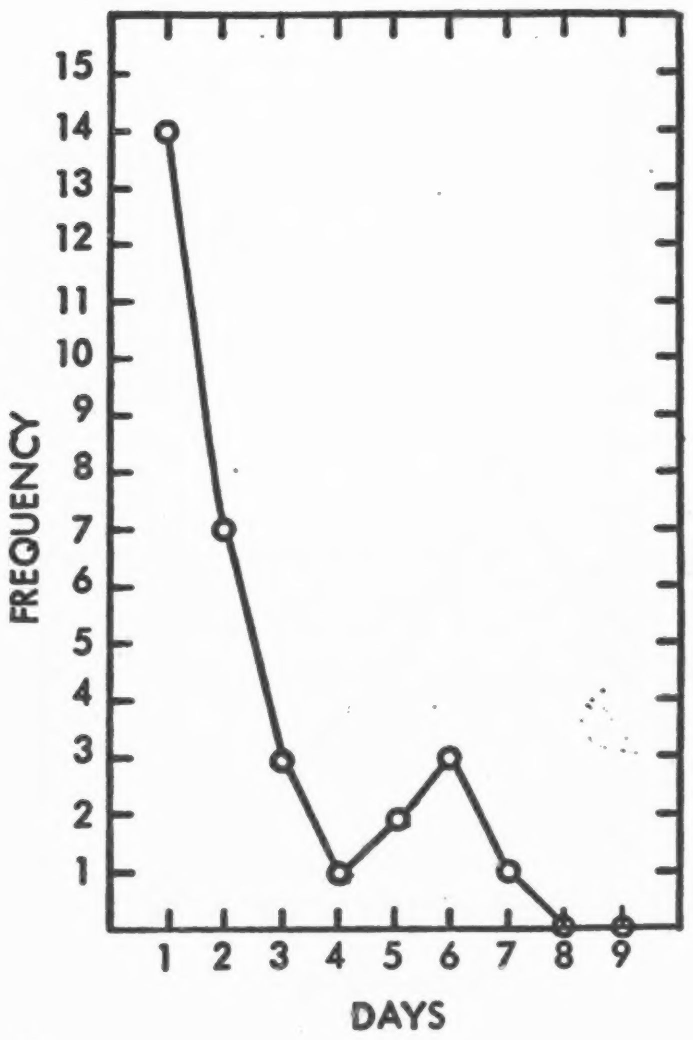

FIGURE 4. Number of random shouting noises from a seven-year old autistic boy.

She would turn off the ignition key, etc. These things, of course, the parents could not ignore. They were in a situation where it was impossible to "time Mary out".

Once Mary was in therapy she responded quite rapidly in most ways. In particular her hyperaggressive pattern gradually disappeared except for those sessions while riding in the family automobile. Finally after a year in therapy we advised the parents to inhibit the behavior using a shock stick.*

Mary's problem was that she did not know the meaning of stop so the parents followed a procedure which conditioned her to terminate any ongoing activity when the parents said "stop. To do this the father, who at first was the only one who had the courage to use the shock stick, waited until Mary started behaving in a particularly obnoxious way, at which point he said "Stop" and within a second or so he shocked her on the thigh with the stick. Up until that point the stick was hidden and after the application it was hidden again. Mary responded by terminating her particularly obnoxious behavior and by crying for perhaps about a minute. This happened a second time and Mary was completely conditioned. She would terminate any activity when her father said "Stop", that is for about a month at which point it was necessary to repeat the procedure once again. This conditioning generalized quite nicely to riding in the automobile as well as in other situations.

*A shock stick is a euphemis for a cattle prod which the parents purchased from Sears through the catalog department. Shock sticks come in several sizes; they purchased the one with five batteries which when applied to ones leg feels like a good hard slap. An application is more aversive than a slap although there are much fewer after affects.

Mary would always stop doing anything however obnoxious when her father asked her to stop from that point on. However, she would not stop when her mother asked her to stop that is until the mother followed the same procedure twice, once at home and once in the automobile.

It has been over a year since these inhibition procedures were used. Mary has continued to behave well in the automobile although the parents sometimes take the shock stick along on long trips just in case.

We mentioned the use of these inhibitory procedures here primarily because it is the only time we have ever had to resort to punishment to eliminate bizarre or aggressive attention earning behavior patterns. The simple extinction processes that we use have worked on all other bizarre or aggressive behavior patterns, easily, quickly and with very little stress. Mary survived her one round with the shock stick without noticible autistic withdrawl symptoms primarily because the procedure was used late in therapy after she had developed a large repetoire of abilities to work positive exchanges. After positive conditioning processes had essentially erased any symptoms of autistic withdrawl.

Training mothers to be assistant therapists

When a child is accepted into the laboratory for therapy, the mother is instructed to keep a daily log describing her encounters with her autistic child. She is asked to write down everything that the child did during a day and describe what she did in response. Also, she is to write a description of the times she tried to get the child to do something and the child's response to her attempts. Each week she would turn in her log which would then be reviewed by the therapist with the view of trying to get a more fully, accurate account of what was happening in the family. Also the therapist views the logs as a basis for checking how well the training in the laboratory was generalizing to the home if any, and for deciding when to move to the next stage of therapy. The logs also were useful in locating reinforcers to use in structuring exchanges with the child. Also the data provided a beginning list of problems in the home, a list that would sensitize the therapist when, at a later stage, he would start observing interaction between the mother and the child in the home. Also, the logs were helpful in working out the specifics for the next stage of therapy. After two or three weeks the mother would then be asked to read several articles and short books on exchange theory and therapy and on conditioning theory and reinforcement therapy. This material was graded easy to hard and the mother was started on the easy material. At various points in the reading program, particularly after completing key sections, the mother would discuss the material with the therapist, asking and answering questions, etc.

Once the mother had progressed well into the reading, she would be allowed to observe her child working exchanges with the therapist. This would usually occur once the child had become accustomed to imitating the therapists motor responses, particularly when the child had began to gain some skill in working puzzles. It is advisable to wait until the child has been socialized to this extent, if nothing else to continue to establish the therapist's expertise with the mother.

As the mother observes the child and the therapist working the exchanges, a second therapist begins to analyze the stream of behavior with the mother, illustrating the various concepts and processes learned about in the reading. This is continued until the mother is facile in analyzing the stream of behavior herself. At this point he is asked to dictate a running account of the exchange processes that go on in two or three sessions much as the sports announcer givex a verbal description of a sporting event.

At this point the mother is allowed to work with the child, taking the role of the therapist, running the imitation exchanges with the motor tasks that the child had become accustomed to. The child that the mother works with in the laboratory is not necessarily her own, at this stage. If, in the judgement of the therapist, the mother would encounter any problems with her own child, she is given a much easier child so that her initial experiences will be successful.

Also, to insure the success of these early exchanges, the mother is coached. The experimental rooms in the laboratory are fitted with a one way wireless communication system. The mother wears a standard hearing aid, fitted with a telephone induction loop which can pick up and amplify any instructions from the therapist from behind a one way mirron. Thus when the mother does not know what to do, the therapist can prompt her by giving her a suggestion or when she makes an error, the therapist can suggest, "next time you might ..." With this immediate help and feedback the average mother is able to do about as well as the therapist from the very first day, that is on exchanges to which the child is accustomed to working.

During this first phase of working with the therapist the mother learns how to use approval, stroking and food to reciprocate for appropriate initiatory responses from the child. She learns to ignore irrelevant behavior, how to time the child out by dropping her head, or holding her head in her hands when the child is noncooperative or when he engages in moderately disruptive behavior. And how to time out the child without fuss into a time out room where she can simply ignore the child's disruptive or bizarre behaviors. It is always established ahead of time what precise behaviors are to result in the childs being placed in the time out room, and the mother is shown the most effective procedures, i.e. not talking while she takes the child by the hand to deposit him in the time out room, and gradually increasing the time out for repeated occurences, etc. She also learns not to ask questions, to use instead simple instruction. She learns how to reciprocate quickly within one or two seconds of the appropriate initiatory response and how to vary the reciprocating pattern, sometime using just approval, sometimes using these as signals for food reciprocation. She also learns how to move from continuous to variable reciprocation.

Once she has mastered these basic skills, the mother is asked to coach one or two other mothers who are also in training. This give her experience in handling problems which emerge suddenly. It gives her further experience in analyzing the flow of exchanges as they occur in the therapy room. It gives her essential experiences whe will need later coaching her husband and her other children at home, for it will be her responsibility to train the other members of her family.

Next the mother is trained how to structure new exchanges with the child. How to use prompting procedures, how to use the childs ability to imitate to get new exchanges started. Also, she learns

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the shaping procedure, that is, how to reciprocate for successfully better approximations to the desired initiatory response. She also has to learn how to move back and forth from the accustomed exchanges which are comfortable to the new exchanges which can be frustrating for the child. The important thing is to press ahead until the child begins to become tense and then move back into more comfortable material only to press ahead again usually a little farther until the child proceeds through the new material and becomes comfortable working the new exchange.

Prior to the time the mother started her reading program, the therapist would have made himself with the logs that the mother had been keeping and then would have spent several days in the home recording the flow of the child's behavior including the interaction between the mother and the child. Care is taken at that time to observe the child at least twice during the various parts of his waking hours. The therapist is equipped with a miniature tape recorder and a stop watch. He observes from an adjoining room and whispers into the recorder a flat description of events as they unfold in the household. The tape recorder is ordinarily turned up to the point where it picks up the verbal interaction between the mother and the child. The stop watch is used to get a measure of the duration of pathogenic and orthogenic exchanges which might be observed. From this flat description the therapist abstracts a description of the exchanges which characterize the interaction between the child and the other members of his family. This abstract, an example of which is given in Table 5, is then given to the mother to help her analyze the situation at home. After some discussion of this abstract, the mother and the therapist decide which of the exchanges are most problematic. Then in terms of the parents' goals for the child, the

TABLE 5

DESCRIPTION OF HOME INTERACTION PATTERNS GIVEN TO THE MOTHER DURING PARENT-TRAINING

Child's Behavior	Parent's Reaction
(1) Plays in bathroom or kitchen water.	(1) Chases after him, yells at him to stop: "Michael Hare, you get out of that water this very instant." (Usually he simply begins again.)
(2) Pulls and pushes for records.	(2) Gives him record--about 50% of the time.
(3) Whines and cries if he is not given what he wants.	(3) Cuddles him and asks him what is wrong.
(4) Gets into food as it is prepared.	(4) Chases after him, yells at him to stop. (Usually he simply begins again.)
(5) Gets into pantry or lower cabinets.	(5) Yells at him to stop. (He usually continues.)
(6) Climbs on top of refrigerator	(6) Yells at him to come down, or asks him to come down over and over again.
(7) Spins objects (plates, compacts, vases).	(7) Goes after him and takes object away (about 50% of time). Ignores him about 50% of time.
(8) Climbs onto kitchen counter, or pulls a chair up to the counter so as to climb up more easily.	(8) Usually tells him over and over to get down. And usually he does not. Eventually, she takes him down bodily.
(9) Plays with his food during a meal (slaps it with spoon, pours it back and forth with spoon.	(9) Repeatedly tells him to stop.
(10) Gets into records, pulls them out, creating a mess by the record player.	(10) Goes after him and tells him to stop. Eventually she ends up yelling at him as he continues to get into the records.

TABLE 5--(Continued)

Child's Behavior	Parents' Reaction
(11) Stands up and rocks back and forth, often with thumb in mouth.	(11) Ignores.
(12) Sits idly fingering silky material	(12) Ignores--unless it is something she is wearing.
(13) Stands outside and urinates (usually onto sidewalk).	(13) Gives him attention, as she usually says: "Why Michael Hare. . . I just don't understand you...!"
(14) Pours, spills, and dumps things onto the floor, right in front of her (looks at her to see if she is getting upset).	(14) Usually gets upset after he makes a mess. She says: "Michael Hare, you're just doing that to tantalize me." Often hollers at him to clean it up.

therapist designs and writes down a simple program for the parents to follow in terminating the pathogenic exchanges and in structuring in their place, more othogenic exchanges. An example of such a plan is given in Table 6. Note that this mother was expected to work just on the more problematic exchanges, the less pathogenic exchanges would be terminated later once the more serious problems were ameliorated.

Often, at this stage, the mothers become relatively creative in structuring situations and thus work closely with the therapist in designing a program. Once illustration of this is a variation of our usual time out procedures which was used on Mary.

Mary had shaped her parents into a terrible procedure for putting her to bed. From the time she was a baby just home from the hospital, she would cry unless they rocked her to sleep. This was bad enough, but then she learned how to awake when they were laying her into her bed. Once awake, she would start crying again until they started rocking her to sleep. This sequence would be repeated several times each evening, often as long as five or six hours. This exchange could have been abruptly terminated by having her parents just put her to bed, walk out of the room and let her cry until she stopped. Eventually she would have given up on trying and gone to sleep quickly without fuss or bother. A similar case has been published by Williams (1956). In the Williams' case, the child cried 45 minutes or there abouts the first night but in suceeding nights the tantrums decreased in duration until, in 10 or 11 days, they disappeared altogether. Similar results would probably have been obtained with Mary but we wanted to see if an alternative strategy could be worked out that would be just as effective but would bypass the crying and tantrums altogether.

TABLE 6

PROGRAM GIVEN TO PARENTS TO RESTRUCTURE THE EXCHANGE PATTERNS IN THE HOME

INSTRUCTIONS:

To Ignore: Do not look at or talk to Michael while he is engaged in inappropriate behavior. Do not tell him to stop, or try to verbally divert his attention, or scold him, or threaten him with punishment.

To Reward: For the present, give Michael approval (verbal, strokes, etc.). For certain things, food may be given (an afternoon snack for working puzzles for awhile; a drink of juice for a household task, etc.). Make sure, of course, that the reward follows the behavior immediately--within a few seconds.

To Time Out: Without speaking, but with some vigor, take Michael to time out room. Leave him in two minutes for first offense, four minutes for second offense, etc. Do not let him out if he is whining or tantruming.

Child's Behavior	Your Response
(1) Pulling and/or pushing a) For records	(1) a) Set aside several periods of the day during which Michael can work for a record (e.g., by picking up toys, clothes, working puzzles). Tell him "As soon as you. . ., you can have a record." At any other time ignore him. To get it started, ignore him until he asks at an opportune time of the day. (Eventually, working for records was established 10 minutes after lunch. It was initiated with Mrs. H. saying, "It's time to work for a record." She would lead Michael to the table and prompt him to work puzzles.)
b) For bath	b) Ignore. Then, when it is proper time, tell him he may take bath or whatever you usually say.
(2) Crying and/or whining	(2) Ignore. This will probably occur after he is ignored for pulling.

TABLE 6--(Continued)

Child's Behavior	Your Response
(3) Playing with stove, getting into food in refrigerator or pantry, climbing on cupboards, getting into food being prepared (assuming that any of these are disturbing to you).	(3) Time out from the kitchen by removing Michael from kitchen and locking door from inside. Open in approximately three or four minutes and repeat each time he repeats inappropriate behavior. Don't let it escalate; don't wait and let him do it for awhile. Remove him immediately. This will work if he likes being in the kitchen. If he does any of these when you are not in the kitchen with him, remove him and lock the door.
(4) Climbing on refrigerator.	(4) Ignore.
(5) Playing with own food (spilling it, slapping it, etc.) or getting up from table to mess around.	(5) Take food away. No food until next meal. Ignore all appeals for food in between.
(6) Spinning objects.	(6) Do not chase him or have a tug of war. Take object away quickly and without speaking. Say "As soon as you. . ., you can spin this. (Have him perform a simple task.)
(7) Water play.	(7) Temporarily, remove him from room and lock door. If he does this during a meal, remove him from the kitchen, and lock him out, and take his plate away. Use this until we attack problem outright.
(8) All bizarre behavior.	(8) Ignore.
(9) Self-initiated working at puzzles, looking in magazines, picking up clothing, helping in kitchen, speech (any approximation).	(9) Reward verbally and with strokes, if convenient, with a bite of food. If he is engaged in such activity for more than a few minutes, reward him several times. Don't just wait until he stops. Reward him during activity if it is longer than 10 seconds or so. Be on the lookout for appropriate behavior and consistently reward it.

After some discussion with Mary's mother and after incorporating a number of her suggestions, the following procedure was used. In the evening, about 7 o'clock, Mary was bathed and dressed in her pajamas, and her doll was placed directly into bed with her under the covers. Once Mary was in bed her mother sat on a chair at the side of the bed, without looking at Mary except out of the corner of her eye. When Mary's eyelids seemed to be closing for the last time, Mary's mother was to get up quickly and walk out of the room. This was period A. The B period was the same except she sat on a chair by the door. In the C period the procedure was again the same except she sat on a chair just outside the door where Mary could see her mother's legs, but nothing else. What happened, interestingly enough, was that Mary never did have a tantrum. Furthermore the time required for Mary to go to sleep decreased precipitiously as may be noted in Figure 5 from 2 hours 15 minutes to 10 minutes on the sixth night. Then the time flucuated slightly until a very stable equilibrium obtained in which every night like clock work it took Mary from 15 to 17 minutes to go to sleep. By the mother's choice she still sits in the hall every night until Mary falls asleep. She relaxes and reads without the other members of the family bothering her during that time. So we left it there!

In general, the mothers are able to structure and effectively work the exchanges thus designed for them in a few days. Following the first few days of structuring exchanges at home the mother has a second session with the therapist in which they work out another written plan to ameliorate the next serious problem, and so on until all of the pathogenic exchanges are terminated and the mother and child are working a suitable set of "orthogenic exchanges" in their place.

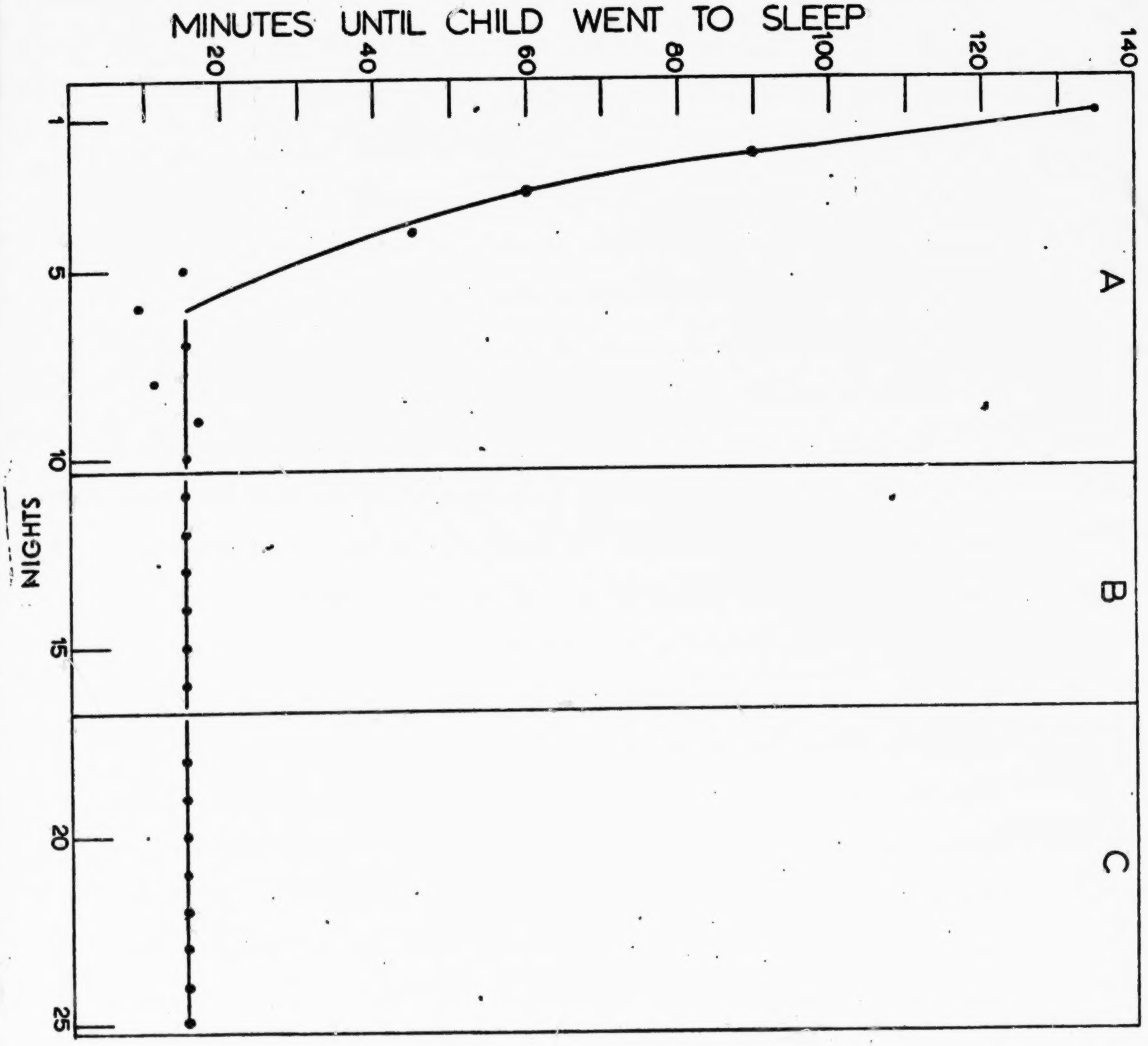

FIGURE 5. Minutes until Mary went to sleep through time through three experimental conditions. Child required mother to rock her to sleep before A. Awakened with crying tantrums when mother tried to put her down. Sometimes took four or five hours to go to sleep. Mother put her to bed with kiss but then no eye contact. Sat in chair by bed in A, then by door in B, then in hall in C, so child could see her until she was about to fall asleep. Attention was reinforcing waking up and tantrum behavior.

Also during this time the mother coaches the father and the other children in working simple exchanges with the child, exchanges similar to or the same as those she had already worked in the laboratory. She trains them to terminate the pathogenic exchanges by using ignoring procedures and time out procedures. And she trains them to reciprocate appropriately. In fact, her success in changing the pathogenic exchange structure of the family depends upon her ability to train the other family members. Since the therapist would ordinarily be there to coach the mother in the early stages of the training, the training is usually a success.

However, in some instances, particularly where parents have habitually punished their autistic child as well as perhaps their other children, more elaborate procedures are required. In these instances the habits gained in the laboratory may not be strong enough to replace the punitive habits which have been dominant so long in the home. In such instances the mother and or other members of the family may be unable to follow the verbal or written instructions of the therapist. When this happens the therapist structures a more powerful exchange between himself and the parents, by using a portable transceiver to give the parents immediate feedback and suggestions in the home. In other words, the therapist begins to coach the mother and the father in the home, much as he had coached the mother in the early stages of training in the laboratory. The therapist usually stands in an adjoining room and whispers instructions into his transceiver. These instructions are then received by the parent via the ear plug from their transceivers. The therapist might give suggestions when the parents are uncertain about what to do. For instance, he might instruct them "next time you might try...," or, as a particularly difficult episide begins to develop, the therapist might say "don't say anything, don't even look at him. Just stand up and take him to the time out room".

At a later point the parents will be trained to work and structure verbal exchanges, first in a laboratory and then at home. But this training has to wait until the child has developed a good speech pattern in the laboratory.

Step Three

This step is used with mute and near mute children. Verbal children who use gibberish or are echolalic, already have the skills which are developed in this step and for them it may be omitted.

During the latter part of the third step, a month or so after the mute or near mute child begins to follow simple instructions or commands, he will generally begin to babble. That is, he emits spontaneous vocalizations which usually are not recognizable as words or sometimes not even as clear sounds. This is because the verbal instructions has become a conditioned.reinforcer after repeated pairings with food reinforcement where it in effect signals food reinforcement. This only happens, of course, after the child reliably follows simple instruction or requests, but once he does do that, then the pairing of the request with the food reinforcement is consistent enough for the conditioning to occur. The child babbles because once the conditioning occurs the sounds which recollect the therapist verbalizations, invoke slightly muted versions of the pleasant sensations produced by food reinforcement. This early babbling is thus expected and it almost always occurs during the third stage of therapy.

When babbling does start to occur, when the child starts to spontaneously emit any sounds at all, the therapist must be ready to start reciprocating with food. This is all stage three is, a structured exchange in which the therapist reciprocates with approval, a pat and food whenever the child emits a sound, any sound. The purpose, of course, is to accelerate the child's babbling.

If the babbling comes slowly in stage three, it may be necessary to use other procedures. One of our therapists has a practice of reciting poetry but stopping abruptly every few words to give the child an opportunity to make a noise. As she varies the sound of her voice, and as she recites a poem with rhythm, the child will often complete the rhythm with a sound of his own. At that point, of course, the therapist reciprocates quickly with approval, a pat and then food. With two completely mute children the poetry procedure has worked. That is after considerable stage two request training.

These procedures are followed until the child is vocalizing a number of sounds at a high steady rate. As in the earlier stages, when the rate of vocalization begins to increase substantially, the reciprocation is varied more and more. Food is not used all of the time, just every second fifth and tenth time in conjunction with approval and a pat. At this point in time approval should be a relatively strong conditioned reinforcer and it will maintain its strength if it signals food reinforcement only periodically every fifth, or perhaps later on, every tenth time. When done skillfully this variable reinforcement will increase the amount of practice a child obtains in any given session by a factor of 5 to 10. He can eat just so many bites of food regardless of how small they are. Practice is important because it develops the childs ability to emit sounds. The childs vocal apparatus has possibly atrophied from disuse (like an arm or leg atrophies from disuse), and it needs to be strengthened carefully by an appropriate regiment of exercise. From our experience with perhaps a dozen mute or near mute children, we have concluded that for them vocalizing is an extremely difficult and costly, if not a painful, experience. Consequently, the child should be given time to develop his babbling to a relatively high rate, thus strengthening his vocal capacity before proceeding to stage four.

Stage Four

The major purpose at this stage is to establish verbal imitation response patterns in children who were mute or nearly mute in the beginning of stage four. Also almost inevitably this stage involves the elimination of the negative behavior syndrome.

The first step is to establish vocalization imitation. The therapist does this by structuring an exchange in which reciprocation occurs when the child responds with any vocalization within five seconds after the therapist has made his vocalization which signals the exchange. For example, after the child has established eye contact with the therapist, the therapist might make a request such as say "ee". If, within 5 seconds the child responds vocally, saying "ee", "ba", "ma", or any other sound, the therapist will complete the exchange by reciprocating with approval, a stroke and food. Even mute children who do not vocalize themselves often understand a certain amount of what is said to them. With this vocalization exchange, the child often has a look of surprise when the therapist reciprocates for what the child knows is a wrong response. This is particularly true with children who are negative because these children understand that they are expected to imitate the exact sound but respond negatively by vocalizing some other sound (this is what we call response reversal). Sometimes a child will smile the first several times this happens as if to say "I got one on you that time".

This procedure has been somewhat controversial among the laboratory staff. Some staff members argue that the procedure establishes an incorrect response pattern that later has to be undone. Doing it correctly the first time they argue would be easier. This may be true. However, this very loose approximation method has been used with a number of children, as has the more exacting method, with much better results. A number of mute and near mute children have developed talking patterns using this loose approximation method, whereas not one mute or near mute child has succeeded in learning to talk when the more exact method was used.

As noted earlier, mute and near mute children find it very difficult to vocalize. The cost is evidently very substantial. They will cooperate in almost any motor exchange only to become negative when the therapist tries to structure a verbal exchange. Since the vocal response is somewhat costly to the child, he becomes negative, but this negativism is taken advantage of so to speak just to get him to start vocalizing reliably in response to the vocalization of another person. Many autistic children are negative and they do, in fact, start systematically to emit sound which are different from that which the experimenter requests. It thus takes the autistic child a little while to realize that his is, in fact, responding precisely as the therapist wants him to. When this happens a child might go through a series of aggressive tantrums to punish the therapist by hitting him, by screaming in his ear, by hiding his eyes, by tramping on the table, by leaving his seat, etc.

Once the child reliably vocalizes within 5 seconds after the therapist has given a vocal exchange signal, the child is ready to move to the next phase. At this point the therapist restructures the exchange such that the child must give a fair approximation in imitating the therapist's verbal exchange signal. For example, if after the child makes eye contact, the therapist asks the child to say "mm" he must make a fair approximation to "mm" before the therapist will reciprocate. If a child has not engaged in negative behavior before this stage, he almost certainly will now. It is at this point that he recognizes what is at stake and engages in an all out battle for the survival of the system he has been enjoying. For several years the child has survived without talking. He has, in the past, successfully extinguished every attempt to get him to talk and he would be rather weak indeed if he relinquished his old habit patterns easily. In any event, it is at this point that the therapist must use the heavy guns so to speak. For a period ranging from one week to a month the child will eat all of his food in the laboratory. He is brought to the laboratory three times a day for his meals and must earn his food by making fair imitations of sounds which he already has in his repetoire. During the first few days the child usually chooses to starve himself rather than repeat the sounds which the therapist wants him to repeat, a sound that he has been vocalizing a number of times a day, perhaps for a month or two. However, his pattern has been that he will say the sound but not on request. This stage is designed to alter the child's past pattern of vocalizing.

The sessions are limited to 20 minutes three times a day. The child has the opportunity to imitate during these periods, and thus earn all of his regular breakfast, lunch or dinner. (The bites at this stage are relatively large.) As long as he refuses to vocalize, respond in a reverse way, or feigns an inability to vocalize, he will simply not eat. Some children do exactly that, spending their 20 minutes being negative and in some cases tantruming for as long as three days (staff sometimes refers to this as the Mahatma Ghandi stage). Eventually, however, the child gives in, sometimes with the accompaniment of tears. He starts imitating slowly at first, then at an increasing rate until, after a time, he finally imitates correctly 100 per cent of the time. A typical learning curve is plotted in Figure 6. These data are from Michael who was completely mute. He did not have even one or two functional words when he began therapy at age 6 years.

Once the power struggle is over, that is, once the child is able to imitate the simple vocalizations reliably it is possible to return to one session a day. While this elimination of the negativism is a taxing procedure for all involved, it accelerates the child's therapy. Indeed, without such a step it is likely that the socialization of a negative child would be impossible.

Once the child will imitate reliably sounds that he already knows, the therapist begins to structure exchanges for new sounds, until all of the vowel sounds are learned. Then new exchanges are structured to teach the child syllables which involve the blending of the vowel sounds with a consonant sound, eg. ba, le, ma, da, etc.

While autistic children are brilliant in setting up and working

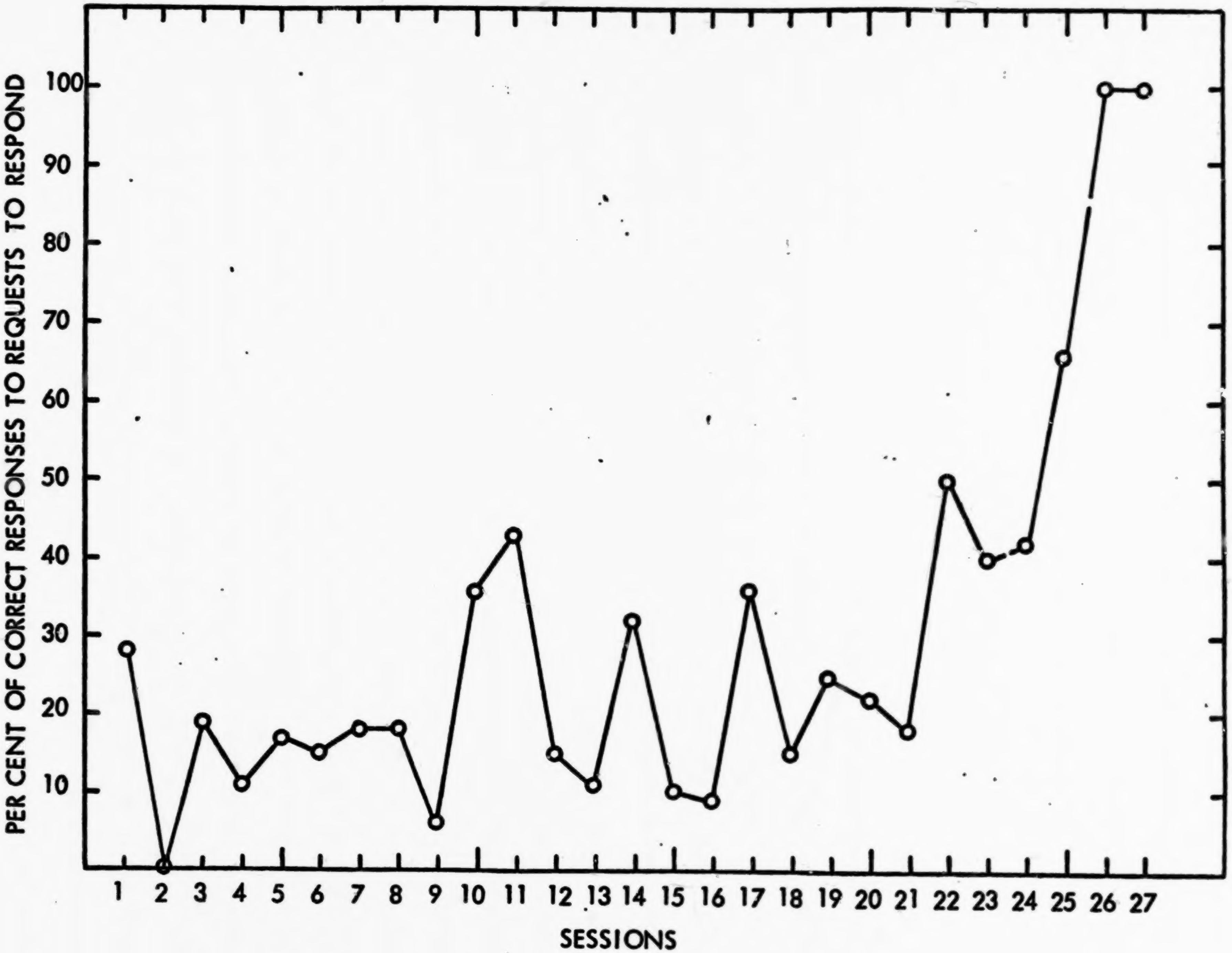

FIGURE 6. Proportion of correct verbal responses to requests during a period when the child received three meals a day in the laboratory.

pathogenic exchanges, they appear to be incrediably slow in learning to work a normal exchange, particularly vocal exchanges. Yet, while speech appears to develop very slowly, it actually does not. Normal children ordinarily take two to two and one half year to learn how to talk.

An autistic child on a well run food-talking exchange will do about as well perhaps in two years. However, to the therapist who is structuring and managing the exchange, the process seems interminably slow, so he ordinarily will have a tendency to increase the terms of the exchange too fast. At first he might be content to reinforce the child for saying simple sounds such as ah, ee, o, oo, and then a simple syllable such as ba, ma, la, etc. But once he is successful in getting the child to move to a higher level it is difficult to move back. Yet that is precisely what is necessary in a successful exchange therapy. Like the practitioners of natural childbirth who have to learn to push and then relax, the therapist must learn to gradually increase the terms of the exchange, thus keeping the child from becoming fixated at a low level, but at the same time he has to be ready to relax to allow the child to regress when he shows the normal signs of stress. The stress comes because the child is being pushed too hard. By allowing this child to slip back to an easier level, the therapist is in effect allowing a natural reversal which a little later will produce an intensification effect when he returns to the more difficult levels. The child will this be more willing to vocalize at the syllabic level when he is allowed once in a while to slip back to the vowel sound level. Then later on he can be pushed to imitate at the word level, being allowed then to slip back to the syllabic level, etc.

When the child has mastered a fairly large number of phonemes (or simple vowels and consonants) and syllables, the therapist will then start structuring exchanges in which the child is required to say names of the food that he is eating before the therapist will reciprocate with the food. We have found generally that mute or near mute children progress much more quickly at the word stage if they are asked to use words which are meaningful to them, that is, where the referents of the words are present for the child to see and otherwise experience. Food words are particularly good for mute and near mute children because most of them already know the meaning of the words. For instance, when a therapist says "Chip" the child already knows that the therapist is referring to a potato chip. Such prior knowledge greatly facilitates the speed of learning. Thus, at this stage the therapist might start the exchange by having the child first imitage a few phonemes and this proceed by having him repeat the name of each bite of food that he eats.

At this point the child is also taught a number of very usable verbs such as move, eat, come, sit, etc. Other researchers who have used talking food exchanges to teach speech to autistic children have gone from the imitation of sounds directly to the naming of pictures (Lovaas, Risley, Wolfe, etc). The natural exchanges that one can signal or structure with a vocabulary of nouns is somewhat limited, whereas the natural exchanges which one can signal or initiate with a few verbs is large indeed. Thus, our procedures call for teaching words which are of maximum use in structuring natural exchanges both in and outside the laboratory.

Stage Five

Once a child is able to reliably imitate food words and a few common verbs, the therapist then moves to what is termed speech training in our laboratories. Toward the middle of the food exchange each day, the therapist begins to ask "What do you want? A chip or a pickle?" At this point the therapist may have to prompt the child by saying "a chip", then later, saying "ch". As the child works this exchange by saying "chip" the therapist reciprocates with the chip, or, if he works the exchange by replying, "a pickle", the therapist reciprocates with a pickle. After a day or perhaps a week of these exchanges the child will reliably discriminate among the different types of food and he will start to ask for the food that he wants. This, in the case of mute children, is ordinarily the first functional speech they will have ever used. At this point the mother is instructed to enlarge the menu to introduce two or three different foods each time, but to continue with food that has been ued in the past three or four meals. This results in a very unusual diet for a time, but what is important is that the child quickly enlarges his functional vocabulary.

During this time the therapist might start training the child to use simple verbs. For example, the therapist might block a doorway that the child wants to pass through, perhaps at the end of the therapy session. As the child tries to push his way through, the therapist resists but at the same time says, "say move" or "as soon as you say move I will let you through". Before long, with such procedures, the child may learn to use as many as one to two dozen common verbs in a functional way.

The next step is to enlarge the child's naming vocabulary. This is done in two ways: by showing a child concrete objects, particularly toys, and by showing him pictures of objects. Initially, our laboratory therapists followed the procedures worked out by Risley and Wolfe which relied on the pictures of objects. The pictures seemed to work reasonably well for echolalic children. The naming of objects in pictures was just too much of a jump for mute or near mute children who had progressed to this stage. This is illustrated in an experiment which we ran with Peter, a near mute child, who had just turned seven years of age when he began therapy. The data in Figure 7 shows his responses during a typical AB AB series. In the A periods, a number of pictures were used. In particular, three that Peter could recognize. A picture of an apple, a picture of a table and a picture of a bell. The two additional pictures which he did not know were also included. A picture of a dog and a picture of a bunny. When the experiment was started the therapist would ask "What is this, Peter. Peter this is a ...". Peter was then to respond with "table" or often the experimenter would only form his lips in the t sound or if the picture were of the apple, the a sound. Peter would then often look from the picture to the experimenters face and repeat the prompt. During both A periods, Peter made very few correct responses, that is responses which did not follow a prompt but which were spontaneous.

During the B period the child was asked a similar question, "What is this Peter". But the question was asked about toys which Peter enjoyed. A ball, a number 1 made out of sandpaper mounted on cardboard, a set of pocket beads, a bubble blower, a wheel, a caster that

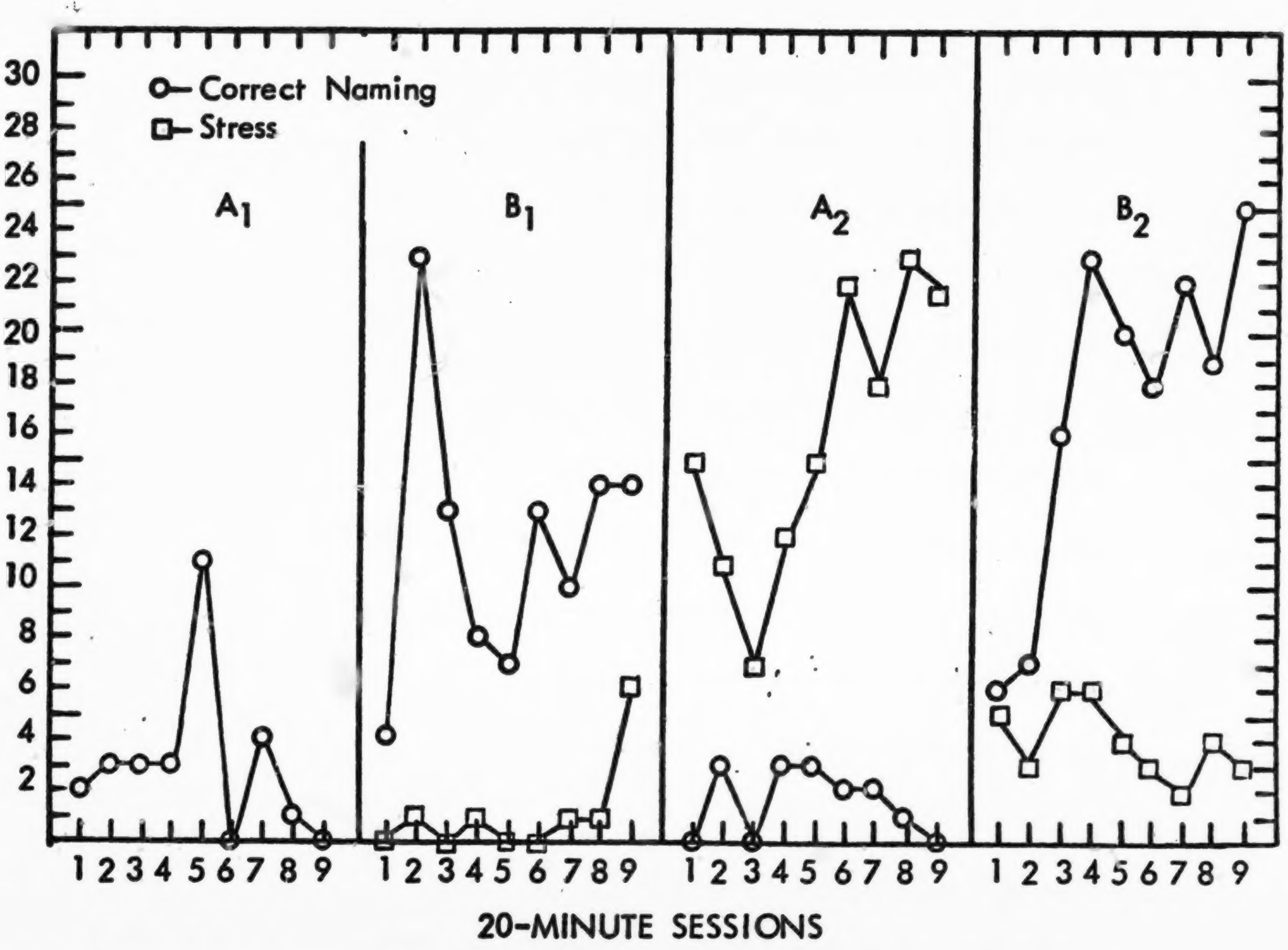

FIGURE 7. Number of correct naming responses and stress behaviors for two conditions. In the A periods, the Risley-Wolf method of picture-naming was employed where the child received a bite of food for each picture correctly named. In the B periods, the child was asked to name a toy. If he named it correctly he was rewarded with a bite of food and was also allowed to play with the toy while he ate the food.

could be spun in a childs hand, etc. Note the number of appropriate responses increased precipitiously during the B periods to an average of about 12 during B^1 to an average of 20 to 22 during B^2.

Also, toward the end of the A^1 period, the staff began to notice that Peter began to revert to some of his older bizarre behaviors, perhaps indicating a certain amount of stress. Beginning with the B^1 period the number of such stress signals were counted. These are also ploted in Figure 8. Note that in the first B^1 period, Peter averaged perhaps one stress per therapy session. During the A^2 period an increasing number of stress responses until the number leveled off at approximately 22 per therapy session and in the B^2 period a decreasing number leveling off at approximately 3 per therapy session.

The experience has been however that once a mute or near mute child develops a relatively large naming vocabulary using familiar objects such as toys, it is then possible to increase that vocabulary using pictures. At first this transition is made by using pictures of familiar objects, preferably photographs of members of the family doing familiar tasks in the home. Once the child develops his skills in responding to pictures of familiar objecrs and people, it is then possible to use other pictures to increase further his naming vocabulary. *

The next stage in speech training is the use of syntax. In general the therapist begins by asking the child a familiar question, preferably about the food, such as "What do you want". Since the child has been trained at an earlier stage to respond by naming the desired food,

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*At this point our procedures are a rather straight forward adaptation of those suggested by Risley and Wolfe (1967).

he will say, perhaps, 'chip'. At that point the therapist would respond "Say, I want a Chip". Reciprocation would occur only if the child gave an approximation to the sentence "I want a chip". For example, "want a chip". As in the previous steps, the emphasis is on getting quantity of response rather than precise response. Consequently the therapist will accept rough approximations to the model sentence so long as the child responds with several words or approximations to several words. This simple exchange is varied in content and worked over and over again until the chile becomes qccustomed to reply to questions in primitive, if broken, sentences.

The best example of this procedure is a variation used by Mary's mother to teach her to speak in sentences while on a family vacation. She recorded most of the conversation on a tape recorder which she named Carol under the ruse of sending a letter to Carol. At this point in Mary's therapy her mothers attention and approval had become a very strong conditioned reinforcer. Furthermore, by this time, Mary, who had been a near mute child (with two functional words, "no" and a private word for "bathroom") had been conditioned to enjoy talking by having proceeded through the first five stages of therapy.

In her log, Mary's mother noted that the family was on vacation and that she had plenty of time to work with Mary without interruption. She had observed syntax exchanges in the laboratory and had been trained to some extent to work them. Beyond that she had a sound understanding of the exchange and conditioning principles to the point where she could use them creatively. The following is abstracted from the log.

Me: Good morning, Mary. (Slight pause.) Good morning, Mommy.

Mary: Mommy.

Me: Say, good morning, Mommy. (Waited for response.) Still got Mommy.

Me: Good morning, Mary. Pause. Now you say, Good morning, Mommy.

(Note: First day all I was able to get was "Mommy" and a big smile, so I hugged and kissed her and again repeated, "Good morning, Mary".)

Me: As soon as we dress, we will eat breakfast. Are you hungry, Mary? Pause. I am hungry.

Mary: Still only slight reply. I hungry.

Me: Are you hungry, Mary? Pause. Say I am hungry.

With slight changes I followed this same pattern throughout each day. Always starting with the above. After the third or fourth day she followed beautifully. Gradually she started initiating conversation. But I still repeated everything she said to me, to let her know I understood.

Me: Mary, are you tired?

Mary: Mary tired, my bedtime.

Me: Yes, Mary is tired and it is her bedtime. As soon as you get into your pajamas, it will be bedtime.

Mary: My bedtime.

Me: Yes, it is Mary's bedtime.

....

Mary: Daddy. Daddy.

Me: He's outside.

Mary: Daddy.

Daddy: What?

Me: Ask if he wants some ice cream.

Mary: Wanna ma ice cream? Dad, wamma ice ceam?

Daddy: No, I don't want any ice cream.

Mary: Me gum me gum me ice cream een ne may.

Me: Daddy doesn't want any ice cream right now? Okay. Well, do you want some ice cream, Mary?

Mary: Please.

Me: Okay. Just a minute and we'll fix you some ice cream. Where's your bowl?

Mary: He mah bol.

Me: Okay. Hop up to the table now, and we'll have some ice cream.

Me: What do you say to mother for giving you the ice cream?

Mary: Ice cream.

Me: Yes, you're supposed to say thank you.

Mary: Kank you. Kank you.

Me: Very good, Mary. You're welcome.

....

Me: Mary, where is our daddy?

Mary: Where daddy, daddy gone.

Me: Yes, daddy is gone. Daddy has gone to work.

Mary: Daddy work.

Me: Good girl, Mary. Daddy has gone to work. Where is daddy, Mary?

Mary: My daddy work. Daddy gone to work.

Me: Good girl, Mary. Daddy will be home tonight. etc.

....

Me: Good night, honey.

Mary: Gee ight.

Me: Say night, night Carol.

Mary: Night, night, Carol.

Me: Good girl. Give me a big old kiss.

....

Me: Oh sure, you have to have shoes on. I wonder if I put these little tights on backwards. Okay, up you go. Now, hand me your skirt.

Mary: Ma want petty coat.

Me: Your skirt on?

Mary: Skirt on.

Me: Good, Mary. I love the way you say skirt on. Stand right here close to me. Could you say thank you, mother?

....

Me: What's daddy watching on the TV?

Mary: TV.

Me: Is it a ball game?

Mary: Mah ball game.

Me: He watches ball games, doesn't he?

Mary: May daddy home.

Me: Your daddy's home. He's watching the ball game. Kenny will be hime in a minute.

Mary: Mah Ken home in minit?

Me: Uh huh. He's out playing with the kids.

Mary: Play games?

Me: They're playing games. He's playing games with the kids.

……………

A year after this vacation of syntax training Mary talks almost exclusively in sentences. Her talking does not have a parrot like quality. She is able to use appropriate sentences to ask for almost anything she wants. She is creative in language much as a normal child. She still has a relatively limited vocabulary but no more limited than a normal 3 year old. She is actually 5 but did not start in language training until she was 3½ years old. She still garbles some words, particularly new words, and she still has some pronunciation difficulties. However, her communication is free and easy and her present difficulties should be easily corrected using standard speech therapy.

Once the child has learned to work the syntax exchanges, the mother is brought into the laboratory to be trained to run speech exchanges. Since, by this time she will already have mastered all of the basic exchange and conditioning principles, the training is relatively easy. Once it is completed the mother is instructed to set up speech-food exchanges at home to enlarge his focabulary and to give him mass practice in using sentences etc. in a functional way.

The last step in this stage is to train the child to work a token exchange. This is done very simply using a procedure which is much less involved and much more effective than the procedure described in the first chapter. The therapist starts by simply handing the child a number of tokens. Then the therapist points to the tokens and says

"Give me the tokens". At this point in the child's training, this is a very simple demand and the child usually responds readily. The therapist reciprocates appropriately with approval, a stroke and food. This step is repeated several times to establish the token exchange in principle. Then the therapist proceeds by asking the child a simple question, perhaps to name a familiar object. "What is this Peter". "This a ball". At which point the therapist reciprocates with approval, and a token. Then he asks Peter to give the token back as before and he reciprocates with food when the token is returned. This process is repeated and then gradually stretched until the therapist is asking the child to name a number of familiar objects, perhaps as many as ten, reciprocating each time with a token. When the child has accumulated his ten tokens, he is allowed to exchange them for a relatively large portion of food, perhaps as many as four swallows of juice, for example. This procedure is extended until the usual 20 minute therapy session is increased in length to an hour. This is a necessary prerequiste for the next stage of therapy when the child is introduced into a group of children.

Stage Six

The primary purpose in this stage of therapy is for the children to learn to work parallel to other children in a classroom situation. This may seem like a very simple goal. However, the transition from working with a single therapist to a classroom where several children have to work with a single therapist is very frustrating to some of the children. An example of the differential reaction of children to this stage is given in the following exerpt which involves Lois, Peter and Kristen.

Prior to the beginning of the session the table had been set up with the tasks set out for each child. When the children were let into the classroom, Kristen, Lois and Peter were shown where to sit. Kristen and Lois sat down quickly and began working their puzzles which they had worked before and enjoyed. Peter sat down docily enough and began to work his puzzle but then he was distracted by Kristen and Lois and he watched them for the next 5 minutes or so. Suddenly Peter got up from the table and started to make loud noises while running around the room (bizarre behavior). At this point the therapist put him in the time out room where he stayed for 3 minutes. By the time he was let out, he had started to cry and had taken off his shirts. As he came back into the classroom he made more noises and climbed up onto the tables and jumped off. Then he brought his shirts over to the therapist's chair threw them down on the floor. All of this time the therapist was making a fuss over Kristen and Lois, reciprocating with approval and tokens as they worked their puzzles. Then Peter came over and climbed up on the table on which Lois and Kristen were working (he first very primly moved the puzzle pieces however, so he would not step on them). At that point he was timed out again. In approximately 3 minutes he was let out of the time out room and he seemed a little angrier than before. He began to climb on the toy shelves and the therapist again timed him out. After about 5 minutes he was then again let out, this time crying rather loudly and unhappily. He still was not about to sit down to work at the table. Rather he spent the rest of the session jumping off things, walking across the table on which the girls were working, etc. Toward the end he began to approach Kristen, particularly, who smiled at him occasionally, but otherwise both Kristen and Lois ignored him and continued with their work.

Beginning the second day it was decided to ignore Peter as much as possible, to avoid placing him in the time out room.

Peter approached the therapist and pulled her arm for attention; she ignored him. He was perfectly able to ask for what he wanted. Peter then frowned and fussed and then continued roaming around the room. He then began climbing again, first on the toy cabinet, then the tables, but was ignored. He was furious at this. Then he went to the far corner of the room, took off both his undershirt and his regular shirt. Everyone ignored him. Then tried to take off his pants but the button holes were so small that he could not force the button through it. He was unhappy because he could not get the pants off; he then came over and looked at Kristen. She ignored him so he hit her. The therapist gave her a lot of attention and ignored Peter during this episode.

And so it went for four days, Peter storming around, hitting, taking off his cloths, etc., and all the time being ignored by the therapist and the other children. Finally, about half way through the fourth therapy session, Peter decided to give up trying to work these illicit exchanges. He simply came over to the table, sat down and started working his puzzle. From that point on the "class" started to progress on the planned curriculum.

The planned curriculum for classes at this stage is rather straightforward. The children work the token exchange through a series of discrimination tasks, those ordinarily stressed in preschools and kindergarden. They involve a number of color discrimination tasks, a number of shape discrimination tasks, a number of manipulation toys, etc. In addition, they are introduced to coloring, to cutting and to pasteing. Also there is a period when the children play outdoors, usually in parallel. At this point the formal food-talking exchanges are discontinued terporarily. Since other functional speech is used to mediate all of the exchanges that occur in the classroom, speech is reinforced naturally. The token exchange is continued; the children work for tokens for a period of up to 15 minutes and then exchange time for a rather large portion of their lunch. The class continues each day for about an hour until the children have mastered the various skills required to do the scheduled tasks, until they are working easily in parallel with one another.

Stage 7

In a token exchange such as those used in the classes described in the previous sections on hyperaggressive children and on ghetto children, the children are motivated to sit at their desks and work on academic and pre academic subjects such as reading, writing and arithmetic readiness. The materials used for these purposes were developed specifically by our laboratory staff or are modified by them from existing material. As part of these readiness programs, the children work through a series of increasingly difficult discrimination tasks involving size, position, shape, and color discriminations. The usual token exchanges are sufficient to maintain steady work patterns on this rather complex material. However, at various points, particularly when new and more difficult tasks are introduced, M&M candies are sometimes used with the tokens in the exchange with the children.

As in the more advanced classrooms the tokens are accumulated by the children and at various times during the two hour program are exchanged for a play period outside, listening to music (which the children enjoy more than movies), playing with a ball with their therapist-teacher, painting, play-doh. Generally speaking, this token exchange is powerful enough to produce a steady flow of activity except, as noted, when difficult tasks are introduced. However, the return to the more primary form of reciprocation (eg., M&M candies) is necessary only during the first few presentations to get the exchange going.

Since in the classroom the exchange usually involves six children and one or sometimes two teachers, the sequence is somewhat different than those illustrated previously. The following flow of exchanges are relatively typical of those which occur in the classroom at this stage.

> All six children are sitting around the group now. They are still working with pictures of animals. It's a rooster now. Mrs. H. has gone to the time out door with Joe's apron. She goes and Joe comes out. She says "Put on your apron now" (exchange signal). Joe looks at his apron and begins to put it on (initiatory response. Mrs. H. goes over to Joe and says "Very good, Joe. Thank you" and gives him a token

(reciprocation). He puts the token in his pocket. Mrs. L. asks him what the picture of the animal is. (exchange signal). "It's a duck", he said (initiatory response). She says "Duck, good" and give him another token (reciprocation). Lois is sitting in her chair and isn't paying too much attention. New she faces the group. Mrs. L. tries to talk to her now (exchange signal) and Lois starts clapping and screaming (initiation of old hyperactive exchange). Mrs. H. takes her to the time out room (no attention reciprocation) ... Lois came out of the time out room and sits down. Mrs. L. says "This is a snake, Lois, a snake" (exchange signal). Lois goes "yeh" (approximation) so Mrs. L. gives her a token and says "good" (reciprocation).

On another day:

Mrs. L. says, "Everybody sit down at the table." (exchange signal) Joe and Becky sit down (initiatory response) and get a token (reciprocation). Bud sits (initiatory response) and gets a token (reciprocation). Larry sits down (initiatory response) and get a token (reciprocation). Lois sits down (initiatory response) and gets a token (reciprocation). Linda sits down (initiatory response) and gets a token (reciprocation). All six kids are sitting down around one table now. Mrs. L. says, "Thank you everybody, for sitting down" ... Mrs. L. Says "Thank you, Becky, you're paying attention real good today" (reciprocation). Mrs. L is helping Joe now (exchange signal.) He's doing what she wants him to do (initiatory response). Joe finishes and she says "Good Joe, you did a good job" and gives him a token (reciprocation). Everybody is sitting at the table. Mrs. L. says to Becky "You can start coloring now" (exchange signal). Becky starts (initiatory response with no reciprocation). Lois is making a lot of noise, screams and yells at the teacher (exchange signal for someone to work her old hyperactive exchange). Everybody ignores her (no reciprocation). As soon as Lois was quiet (initiatory response), Mrs. L. went and sat down by her and talked to her (reciprocation for positive exchange).

The secondary emphasis at this stage of therapy is social; that is, the exchanges are structured so that the children are involved in games in which they must attend to and interact with one another. The therapist's role in these games changes slightly from that of teacher to that of leader. As the children's repetoire of games is developed, they are encouraged to select the game that they wish to play and to run the games themselves. As in the other tasks a token exchange is used in which reciprocation by the teacher is contingent upon cooperation or at least successively better approximations to cooperation in the various games. Again M&M candies are used sometimes to complete exchanges, particularly when new games are being introduced.

While the primary purpose of the games is to develop a cooperative behavior pattern with peers, games have two additional important functions: (1) particularly at the singing games, the children get excellent practice in speech; (2) the games such as Farmer in the Dell, London Bridge and Ring-a-Round the Rosy maximize the childrens contact with one another and in the long run condition the children positively to one another.

In addition, the laboratory is beginning to develop games and other features to establish a firm pattern of peer imitation. As Bandura and Walters have pointed out, much of the socialization process occurs among nurmal children simply because they learn to model their behavior after children who are successful in working positive exchanges with others in the environment. The autistic child, we have found, is extremely good at modeling peers who work pathogenic exchanges, but he is generally completely deficient in modeling children who are successfully working positive exchanges. Thus, this behavior pattern has to be carefully developed in therapy.

The first step in developing a peer imitation pattern has been successfully pre-tested in the laboratories. It involved a game where one of the children hides an object such as a red cardboard square, a green circle or a ball, while the other children close their eyes. The person who hides the object then chooses another child to find the object. The rest of the children remain at the table while the finder attempts to locate the object by searching around the room. The children at the table may work token exchange by attending to the finder. The teacher reciprocates periodically with tokens for those children who keep their eyes on the finder until he locates the object. Once he locates the object, the finder receives a token for his trouble and in addition a piece of candy or a cookie. Thus, the children at this point are simply being shaped to observe a model who is rewarded. At a later point a number of games will be constructed where children are rewarded for not only attending models but for imitating models who are successful in working positive exchanges, in contrast to models who are not successful in working positive exchanges.

Finally as in all but the sixth stage, a food exchange is used. It occurs during the final 20 minutes of the two hour class. At this point generally two children are paired with one therapist and the therapist alternates back and forth between the two children, working upon each of the children's specific problems, such as pronunciation, the appropriate recognition of various i.t.a. symbols, writing, etc. The procedures followed in these food exchanges are similar to those discussed in detail earlier. The only difference is that the children do not have the therapist's attention while they are chewing their food. During that time she would be working with the other child in the pair.

Preliminary Results

While it is too early in the program's history to give a thorough evaluation, at least there are preliminary results which give some indication of a basis for evaluation.

Thus far, 18 autistic children have been accepted for exchange therapy in the program. Of these, 6 were echolalic, 5 were near mutes (that is they had two to five functional words which they used occasionally) and 7 were completely mute. Three of these (Marty, a near mute, Kim a mute, and Sean a mute) had been in therapy less than six weeks. Since six weeks is too short for even a preliminary evaluation these three cases will be eliminated from further consideration.

Of the 15 who have been in therapy long enough to be evaluated, all have made substantial progress through the various stages of therapy. Only four of the children have followed the program as it is outlined here. These have made the fastest progress. One of these children, John, entered therapy just as he was three years of age. A near mute at that time, he progressed rapidly through the first four stages in approximately six months. By that time his behavior was completely normal except for his speech, which, nevertheless, was within the normal range. He could talk in sentences, communicate about almost anything, and was creative in the way he used his language.

The other two children, Kristen and Ross, were echolalic and have progressed nicely to stage 6. The fourth child Michael, a mute, has been in therapy for six months, has progressed nicely through the first three stages and is now about half way through stage four. This is excellent progress for a six year old with a large number of behavioral deficits.

Four other children, while they have taken more time since they received therapy as we were developing the present program by trial and error, have completed stage six. Linda and Jeff who were originally echolalic talk well, even without pronunciation problems. Both are in the process of learning to read. Jeff was severely autistic. A severe head banger who spent most of his time in autistic seclusion, talking gibberish, repeating television commercials, and engaging in other forms of repetitive bizarre behaviors. However, in therapy, he emerged as a brilliant child who learned to read i.t.a. and traditional orothgrophy simultaneously at a rate faster than any of the brilliant 5 year olds in our normal pre-school (remember a number of these 5 year olds had I.Q. exceeding 149).

Mary and Jerry, near mutes, have been in exchange therapy in our laboratory for two years. Both talk in sentences freely, easily, and Jerry without pronunciation problems. Both of these children could learn at a normal rate in a classroom where an effective token exchange was in operation. Of the remaining six children, two have made very satisfactory progress. Lois, after 10 months is at the beginning of stage seven and Billy has just entered stage six. The other children are at various stages but their progress has been just fair. They are all older, ranging from six to eight years of age and all were extremely negative. Their progress was held up because, in part, we had to experiment with a number of different procedures for eliminating negativism, before arriving at the procedures described above. Once that procedure was worked out in detail, however, these children began to get over their negativism and since have made rather good progress.

In general, our procedures are extremely effective for eliminating bizarre, aggressive and other ellicit attention earning behaviors. Particularly after the mother is trained these autistic behaviors vanish. An autistic regression will sometimes occur with the children, but only after the parents have inadvertently structured the old pathogenic exchanges, allowing the children to work them again. These reversals ordinarily are easy to take care of. The therapist simply reviews the home situation with the parent, locates the trouble and writes a plan for ameliorating it.

After a time the autistic children simply loose their taste for pathogenic exchanges. They get so good at working normal, positive exchanges, and these turn out to be so much more interesting, that they just do not bother with the old autistic patterns, This does not mean they could not be shaped up again to be autistic, but simply that the parents do not have to be on their toes every minute because the child is not trying to find a pathogenic exchange to work.

Finally, all of the children have come out of their autistic seclusion. All will look other people in the eye. All attend the others in their environment. They enjoy playing with their brothers and sisters and other children. They enjoy interacting with adults. Perhaps because we do not use punishment, all have developed a rather strong attachment to the therapist and this generalized quickly to the other members of their family and then to the other children in the laboratory classes.

What we find most problematic with exchange theory is the development of normal behavior, particularly normal speech and normal imitation patterns. Also we experience some difficulty with parents. A minority of the mothers are relatively incompetent and they require constant help and in some instances considerable training and counseling beyond that described above. However, all of the mothers, in fact all of the families, have been genuine in their concern for their autistic children and have been willing to cooperate to the limits of their ability, and our ability to train them effectively.

A summary of the preliminary results of the 15 children is given in Table 7.

Thus the present series of investigations to date have culminated in a social exchange theory of autism, a relatively straight forward therapeutic program which has shown considerable preliminary success. The most difficult of all autistic children, even those without any speech have made some degree of progress. There are still undoubtably many improvements to be made, both in the theory and in the therapy which derives from the theory. Nevertheless, the progress to date has been substantial.

TABLE 7

PRESENCE OF VARIOUS CLASSES OF BEHAVIOR IN THE AUTISTIC CHILDREN IN AUGUST, 1968

Child	Birthdate	Date Enrolled	Class of Behavior			
			Friendliness*	Speech**	Autistic Seclusion+	Illicit Attention-Earning Behavior+
Mary	10/18/62	11/66	4	4	0	1
Jerry	3/17/62	10/66	3	4	0	0
Larry	1/13/62	11/66	4	4	0	1
Linda	4/23/61	1/67	4	4	0	0
Peter	5/19/60	4/67	2	2	3	3
Joe	10/ 5/60	5/67	2	4	0	2
Billy	6/17/64	9/67	2	2	0	1
John	5/15/64	9/67	4	4	0	0
Jake	4/ 6/62	9/67	2	1	3	3
Lois	12/11/62	9/67	3	2	1	2
Luke	5/10/61	9/67	4	2	0	3
Kristen	12/27/60	11/67	3	4	3	3
Jeff	7/30/62	9/67	3	4	1	1
Michael	1/31/62	2/68	3	1	2	2
Ross	7/ 9/64	2/68	3	4	2	2
Kim	4/12/57	6/68	3	0	3	4
Sean	4/13/61	6/68	3	0	3	3
Marty	2/16/64	7/68	2	0	3	4

*4 = outgoing; 3 = initiate and respond; 2 = reserved but approachable; 1 = unapproachable.

**4 = appropriate speech most of the time; 3 = syntax by imitation; 2 = some functional words; 1 = word and sound imitation; 0 = mute.

+0 = absent; 1 = present under stress; 2 = only occasionally; 3 = mixed with some positive patterns; 4 = all the time.

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